

**Crosslinguistic influence on the syntax/pragmatics  
interface: testing the intuitions of older Greek-German  
bilingual children**

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## **Declaration**

I have read and understood The University of Edinburgh guidelines on Plagiarism and declare that this written dissertation is all my own work except where I indicate otherwise by proper use of quotes and references.

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## **Abstract**

The aim of the present study is to test whether structures belonging to the syntax-pragmatics interface, which have been found to cause difficulties to younger bilinguals with different language combinations, are still vulnerable to crosslinguistic influence in older Greek-German bilingual children at approximately 13 years of age. A further aim was to examine the role of language dominance and the extent to which this factor can account for the differences found. Experimental data are presented from 30 Greek-German bilingual children growing up in Greece, 15 dominant in Greek and 15 in German. These two groups are compared to the control groups of age-matched monolingual children and adult speakers of Greek. The structures tested are the use of null and overt subjects in [-topic shift] conditions in Greek and the interpretation of anaphora when either a null or an overt pronoun is used in two constructions, forward and backward anaphora. The first structure was tested with the use of elicited production data and acceptability judgements and the latter with a picture verification task. The performance of the different groups of speakers was found to be variable, depending on the structure examined; the German-dominant bilinguals were found to differ to a bigger extent from the monolingual controls compared to the Greek-dominant bilinguals, suggesting that dominance and input are two factors which play a decisive role in determining the linguistic performance of bilingual children. Finally, an explanation based on the different processing abilities of the two groups of children is also taken into consideration.

# CHAPTER 1

## Introduction

### 1.1. Bilingualism in general

The study of bilingual children has been a domain of major interest in the past decades and different views have been proposed concerning the way the two languages develop in the same person, their interaction and the consequences this path of language acquisition has on general cognition. In the first years of studying bilingualism, the simultaneous acquisition of two languages was often treated as a disadvantage which made the life of bilingual children more difficult and had detrimental effects on their cognition and their psychological development. The following statement constitutes a characteristic example of this view: 'If it were possible for a child to live in two languages at one equally well, so much the worse. His intellectual and spiritual growth would not thereby be doubled but halved. Unity of mind and character would have great difficulty asserting itself in such circumstances.' (Laurie, 1890 quoted in Wei, 2000). Until recently some authors still viewed bilingualism as a disadvantage. Moreover, apart from some researchers working in the language faculty, many people with no scientific relation to bilingualism and language in general express their prejudice towards bilingual language acquisition. It is therefore of considerable importance that a large body of recent research has examined bilingual speakers and it is no longer believed that bilingualism *per se* constitutes a problem.

Furthermore, as the number of bilingual children grows rapidly, due to sociological reasons, it is important to examine bilingualism not only in order to reach conclusions about language acquisition in general but also in order to make correct decisions concerning the education of these children. According to some estimations, half of the world's current population is bilingual (Grosjean, 1982: vii). As a bilingual is not the sum of two monolinguals but a different and competent speaker-hearer (Grosjean, 1994), it is necessary to evaluate the linguistic performance of these two groups of speakers using different measures and criteria. As expected, the monolingual norm



serves as a reference point in order to compare these two types of language acquisition; this comparison should, however, serve as a means of understanding the general mechanisms of language acquisition and it should not substitute the appraisal of bilingualism without using monolingual standards.

As bilingualism is a complicated concept, which involves the interaction of many factors, it has been studied by researchers from different backgrounds and with the use of different research methods. All these studies examine bilingualism from a different perspective and, as they usually aim to answer different research questions, at first sight their results often seem contradictory. However, an important step in order to understand the mechanisms which influence bilingual acquisition would be the combination of the findings from different experimental domains in order to reach a holistic theory about bilingual language acquisition.

As far as the terminology used is concerned, a lot of confusion has been caused due to the fact that the terms *bilingualism* and *bilingual children* have been used almost interchangeably in order to refer to two different groups of speakers: simultaneous and successive bilinguals. Those groups differ with respect to both the age at which the second language was acquired and the level of proficiency. In this dissertation, the terms bilinguals and bilingual language acquisition will be used to refer only to simultaneous bilinguals who have been exposed to both languages from birth and use them on a daily basis. However, although these children have acquired the two languages simultaneously, they are not expected to be perfectly balanced bilinguals, as such cases are extremely rare; the idea of a bilingual who has native-like control of both languages is an unrealistic one. Consequently, linguistic dominance, a factor strongly related to the input the bilingual child is exposed to, plays a decisive role in bilingualism in general and particularly in the children examined in this study.

This study considers experimental data from 13-year-old Greek-German bilinguals and it examines the possible influence of German upon Greek with respect to structures which belong to the syntax-pragmatics interface. Linguistic dominance, as a factor which determines crosslinguistic influence, is taken into consideration both in the design of the study and in the discussion of the findings. According to the results, crosslinguistic influence is evident even at quite late stages of language acquisition, although the fact that this influence was found only in the group of German-dominant

bilinguals, suggests that dominance plays a decisive role in determining the direction and existence of influence of one language onto the other.

## **1.2. The structure of this study**

This dissertation includes six chapters which follow this introduction. Chapter 2 presents an overview of the literature on bilingual first language acquisition, focusing specifically on studies which examine crosslinguistic influence between the two languages of bilinguals at different ages with different language combinations.

Chapter 3 states the hypothesis and predictions of this study and is devoted to a description of the two languages examined with respect to the structures in question, namely the use of null and overt subjects and the assignment of pronoun antecedents in Greek and German. The two languages are described with a special emphasis on their similarities and the differences with respect to these two constructions. The aim of this analysis is to explain the reasons these two languages are appropriate in order to examine the possible influence of one upon the other.

Chapter 4 deals with the methodology which was used in this study. It includes a description of the characteristics of the participants who took part in the experiment and of how language dominance was evaluated in the group of bilinguals. This chapter also provides an overview of the materials and the testing procedure, with the materials themselves included in the Appendices: appendix 1 contains the materials used in order to test null and overt subjects; appendix 2 contains the respective materials for anaphora resolution; and finally appendix 3 presents the questionnaire completed by the parents of the bilingual children in order to determine language dominance and provide a detailed picture of the linguistic profiles of the families alongside some biographical data of the four groups of participants.

Chapter 5 contains the results obtained for the two structures under examination. These data are presented using figures and tables and a short report of the statistical results is also included.

Chapter 6 discusses the results for each structure as well as the more general findings of the study and how they relate to other studies which examine similar subjects. Moreover, different explanations are proposed and some of the factors which must be taken into consideration are analyzed. These include the special status of interfaces; the differences in linguistic dominance and the input the two groups of bilinguals are exposed to; and the role of the developmental component in language acquisition in general and bilingual acquisition in particular.

Finally, chapter 7 states the conclusions which can be drawn from this study as well as some suggestions for future research.

## **CHAPTER 2**

### **Literature review**

#### **2.1. One linguistic system or two?**

In the first years of studying bilingual children, the question of whether they begin with a unitary system which later develops into two independent languages arose and two contradicting views were proposed. According to the first, bilinguals begin with a unitary, undifferentiated linguistic system. As language acquisition continues, this system develops into two separate languages. This one-system hypothesis has been largely based on the observation that in the early developmental stages bilingual children tend to mix elements from their two languages, and only later on are they able to differentiate and systematically code-switch between them (Meisel, 1989). Voltera and Taeschner (1978) argue that bilingual language acquisition consists of three stages: in the first stage the child has one linguistic system which contains words from both languages; in the second stage the existence of two differentiated lexicons follows and the bilingual child's lexical system starts to have two words for one object, one in each language, whilst applying the same syntactic rules to both languages; in the third stage, he/she finally manages to separate these two systems on both the lexical and the syntactic level. According to this argument, it is only when the child has reached the third stage that he/she can be described as 'truly bilingual' (Voltera and Taeschner, 1978).

Most studies which support the one-system hypothesis have been criticized for their methodological shortcomings (i.e. Meisel, 1989). Moreover, since Meisel's study, several researchers have found evidence contradicting the one-system view, such as the existence of translation equivalents even in the early stages of language acquisition (i.e. Nicoladis, 1998). Furthermore, Meisel (1989) argues that even at the two-word stage bilingual children are able to apply the syntactic rules of their two languages, such as correct word order. According to this point of view, the occasional use of the 'wrong' language can be attributed to the fact that one of the two languages is more accessible, and should not be treated as evidence in favor of the existence of a

fused linguistic system (Grosjean, 1982: 204). In addition, it has been noted that bilingual children use items from their two languages in a different distribution, depending on the context (Genesee, 1989). This observation stands in line with the existence of a differentiated linguistic system from the early stages of bilingual language acquisition. According to this argument, mixing elements from the two languages is explained as on-line borrowing of lexical items from the other language due to lexical gaps and does not constitute evidence in favor of the existence of a single, fused linguistic system.

The present consensus among researchers in the field of bilingualism is that children who grow up with two languages possess two linguistic systems, although these are not impermeable. As a result, attention has shifted towards determining the way in which the two systems interact and influence each other and in specifying the conditions which must be met in order for this influence to manifest itself.

## **2.2. Research on bilingual first language acquisition**

The differences found between monolingual and bilingual first language acquisition have been examined using different language combinations and different structures and the results have sometimes lead to contradicting conclusions. While it is accepted that these two paths of language acquisition are different, there is no consensus concerning the source of the differences which are manifested in most studies. Some explanations which have been proposed in order to account for the results obtained include: language internal factors; the difference in complexity between the two languages; linguistic dominance; the special status of interfaces; the input bilingual children are exposed to and the differences in the computational load bilingual and monolingual children are confronted with. The following section will give an overview of some of the studies which have examined bilingual language acquisition and have reached some of the aforementioned conclusions, focusing specifically on studies which examine the existence of crosslinguistic influence between the two languages of the bilinguals.

### **2.2.1. Crosslinguistic influence**

Several researchers have attributed the differences they found when comparing the bilingual children they studied to the monolingual norm to the contact between the two languages of the bilinguals. The following part of this literature review presents studies which examine different language combinations and different structures and offer at least a partial explanation of their results in terms of crosslinguistic influence. The studies differ with respect to the structures examined: the first two (Döpke, 1998 and Paradis, Nicoladis and Crago, 2007) consider purely morphosyntactic constructions; the others focus on structures which belong to the interface between syntax and other cognitive domains.

The first study is that of Döpke (1998), which examines the acquisition of word order by German/English bilingual children. These two languages differ concerning their syntactic structure, as German allows both V\_XP and XP\_V order, while only the V\_XP order is possible in English. As a result, there is partial overlap between the two languages and the children are confronted with competing evidence. Consequently, the German/English bilinguals are found to overgeneralize the V\_XP order in German to contexts where only an XP\_V construction is grammatical. Döpke argues that the influence found should be attributed to the cue competition bilinguals are confronted with, as they acquire two languages which provide them with contradicting evidence concerning the structure under examination.

In another study Paradis, Nicoladis and Crago (2007) examine the acquisition of a morphological feature, namely the formation of the past tense, by English/French bilinguals. According to their conclusions, language internal factors and linguistic dominance interact and they argue that the structure under examination differs in the two languages according to whether it is transparent or opaque and distinguish between type and token frequency. According to their argument, these two factors interact in the bilingual children of their study and they result in crosslinguistic influence of one language upon the other. However, as these factors alone cannot explain the pattern they obtained, they claim that dominance also plays a decisive role.

Kupish (2007) examines a structure which belongs to the syntax-semantics interface: the acquisition of determiners by German/Italian bilingual children. The use of articles in these two languages differs with respect to their semantic interpretation and according to Kupish, crosslinguistic influence is present in a given structure if one of the languages is beneficial to its acquisition. Moreover, the author argues that this influence might lead either to acceleration or delay in the rate of acquisition. Finally, dominance is found to play a contributing role, although it must be noted that several other studies which examine structures which meet Kupish's criteria do not find any change in the rate of acquisition. The predictive and explanatory power of the proposal of Kupish is therefore diminished.

An influential study, which motivated various other researchers either to replicate or to contradict their results, was conducted by Müller and Hulk (2001). According to the hypothesis of these authors, certain criteria must be met in order for crosslinguistic influence to occur. They argue that there must be partial overlap between the two languages and that the structure has to belong to the syntax-pragmatics interface. In this case, the input bilingual children are confronted with is ambiguous, as they are exposed to competing evidence, and the overlapping construction is overextended to a context in which it is not appropriate in one language. Moreover, according to Müller and Hulk's hypothesis, this phenomenon occurs before the C(omplementizer)-domain is in place. After the development of the C-domain, which is thought to be responsible for the anchoring of syntax onto pragmatics (Argyri and Sorace, 2007), this influence ceases and the bilingual children conform to the monolingual norm. Müller and Hulk reach these conclusions based on the study of bilingual children who were speakers of a Germanic (German or Dutch) and a Romance language (Italian or French). The structures they studied are object drop and root infinitives. These two structures meet the above-mentioned criteria but differ concerning whether they overlap at the surface level: in the case of object drop, the children are confronted with ambiguous input, while in the case of root infinitives there is no partial structural overlap. According to the results of this study, crosslinguistic influence is found only in object drop, while the use of subjects with root infinitives remains unaffected. These findings confirm their hypothesis about the necessity of all the above-mentioned criteria for crosslinguistic influence to manifest itself. Finally, the authors claim that language

external factors, such as language dominance, do not play a role in determining crosslinguistic influence.

As previously mentioned, the hypothesis of Müller and Hulk motivated various other studies. A structure which has been examined extensively in order to test the hypothesis of Müller and Hulk is the use of overt subjects by bilinguals who acquire a null-subject and a non null-subject language. This construction also belongs to the syntax-pragmatics interface, as the use of an overt subject in null-subject languages is determined by discourse factors. Moreover, the production of redundant overt subjects doesn't lead to ungrammaticality in the null-subject language, but to a pragmatically inappropriate utterance.

One of the studies which examine this structure was conducted by Serratrice, Sorace and Paoli (2004). Their subject was an English/Italian bilingual child and the study found that the child makes use of overt subjects in contexts where they are not appropriate in Italian. These findings replicate those of Müller and Hulk, as the structure examined meets the criteria set by these authors which are thought to be necessary for crosslinguistic influence to occur. However, Serratrice, Sorace and Paoli argue that this influence is persistent over time, as it does not necessarily cease after the C-domain is in place.

A similar study with a different language combination was conducted by Hacoen and Schaeffer (2007). These researchers also examine the use of overt and null subjects in bilingual English/Hebrew language acquisition and they attribute the fact that their subject differs from her monolingual peers with respect to the use of overt subjects in Hebrew to crosslinguistic influence from English.

Another study which tests the hypothesis of Müller and Hulk was conducted by Argyri and Sorace (2007). These authors examine older English/Greek bilingual children and include structures which belong both to the syntax-pragmatics interface and to the domain of narrow syntax. According to their findings, only one of the structures in each domain is subject to crosslinguistic influence from English. While the use of overt subjects in Greek, which is a null-subject language, does not provide any conclusive results, crosslinguistic influence is found in the use of preverbal subjects. According to the results of this study, dominance and crosslinguistic



influence are related. Moreover, language internal factors also play a decisive role, as influence is found only in the direction of English onto Greek. The authors argue that the hypothesis of Müller and Hulk can also be applied to structures which do not belong to the syntax-discourse interface, as long as there is structural overlap. In addition, their findings suggest that crosslinguistic influence can be found after the C-domain is in place, as their subjects had a mean age of 8 years. The authors also propose an explanation based on the processing limitations of bilingual children. According to this line of thinking, the fact that these children have to handle two languages simultaneously causes a bigger computational load, which might result in the production of pragmatically inappropriate structures in one language.

Finally, Paradis and Navarro (2003) also examine the use of subjects by a Spanish/English bilingual child and reach similar conclusions regarding the existence of crosslinguistic influence in subject realization (Paradis and Navarro, 2003). However, this study differs from the above-mentioned ones, as the authors systematically analyze the contexts in which redundant subjects are used. Moreover, they also consider the input this child is exposed to and code it in a careful way, while most other studies examining bilingual children describe the input using general and impressionistic criteria. Paradis and Navarro, on the contrary, examine the production of the parents and find that it differs from that of typical monolingual speakers of Spanish, as it contains more overt subjects, due to the fact that the mother is not a native speaker of this language. As a result, they argue that the production of the child reflects the parental input. Paradis and Navarro claim that both crosslanguage contact and the nature of the input the bilingual child is exposed to interact, thus resulting in the pattern they observe. It is, in general, quite often the case that bilingual children receive non-native input in one of their languages, or input from speakers who are under the process of attrition and who have been found to differ from typical native speakers concerning certain structures, such as the use of overt subjects in their null-subject language (i.e. Montrul, 2004).

### 2.2.2. Processing limitations

Not all studies which examine the use of overt subjects by bilingual children who acquire two languages which differ with respect to whether they license null subjects reach a similar conclusion. Apart from the existence of crosslinguistic influence, some researchers have supported the argument that the differences found between bilingual and monolingual children can be attributed to the processing limitations of the first, as they are confronted with a bigger processing load and might, therefore, use different strategies than those used by monolingual children.

Sorace et al. (2009) conducted a study which included bilingual children with different language combinations. Apart from English/Italian bilinguals, the researchers also studied Spanish/Italian bilingual children, who acquire two null-subject languages. According to the results they obtained, these children are also found to produce more pragmatically inappropriate overt subjects compared to their monolingual peers. These findings lead the authors to conclude that overt subjects are a default, used by bilingual children regardless of their language combination. However, the effect is found to be bigger in the English-Italian bilinguals growing up in the UK, thus suggesting that dominance plays a contributing role by enforcing a tendency found in all bilingual children. Contrary to their monolingual peers, bilingual children might use the default option more often due to processing limitations, which are attributed to bilingual language acquisition *per se*.

Finally, Pinto (2006) also finds evidence to support the claim that bilingual children go through a phase where they use inappropriate overt third person subjects in their null-subject language. Based on the study of Italian/Dutch bilinguals, Pinto argues that the reason for the production of redundant subjects is the fact that bilingual children follow the 'principle of economy'. In other words, as bilingual children are confronted with a bigger processing load compared to monolinguals, they adopt the structure that requires the least effort, which is possible in both languages.

### 2.2.3. Language dominance

An important concept in many of studies discussed in this chapter and in bilingualism in general is language dominance. In a large-scale study conducted by De Houwer (1995) different patterns of exposure in bilingual language acquisition are compared. According to the results, balanced bilingualism in early childhood is usually achieved if both parents use the minority language or if both speak the minority language and only one uses the majority language when he/she interacts with the child. However, the most frequent pattern in bilingual families is the *one parent one language* strategy. In general, it can be argued that the child becomes dominant in the language in which it receives more input; consequently, bilingual children are usually dominant in the language of their community. However, there might be exceptions to this rule, as some children receive less input in the language of the community they live in due to the specific environment in which they grow up and this would seem to be the case in some of the bilingual children examined in this dissertation.

Linguistic dominance is also an important factor in many of the studies discussed in the literature review, as it determines the pattern of crosslinguistic influence (i.e. Argyri and Sorace, 2007; Paradis, Nicoladis and Crago, 2007; Kupish, 2007). As a result, it would appear that dominance seems to interact with all the explanations mentioned so far.

## **CHAPTER 3**

### **This study**

This dissertation was motivated by some of the aforementioned studies and its aim is to test whether bilingual Greek-German children with a mean age of approximately 13 years differ from their age-matched monolinguals with respect to the use of two structures in Greek, both of which belong to the syntax-pragmatics interface: the use of null and overt subjects and the assignment of pronoun antecedents. These structures were chosen as they have been found to cause difficulties to bilinguals in previous studies which examined similar populations with different language combinations.

#### **3.1. Hypothesis and predictions**

The hypothesis explored in this study is that there is a difference between bilingual and monolingual children in the structures under examination in Greek due to the contact they have with German. Moreover, this study aims to test the role of dominance and the way it interacts with language internal factors. Finally, as it examines bilingual children at an older age compared to those which were tested by other researchers, this study aims to find out whether possible crosslinguistic influence is persistent over time and whether it can be found at this relatively late stage of language acquisition.

As far as the predictions of this study are concerned, previous research on bilingual children acquiring a null- and a non null-subject language has provided evidence to show that the null-subject language of bilinguals contains a higher proportion of overt subjects than the language of their monolingual peers (i.e. Paradis and Navarro, 2003; Hacoen and Schaeffer, 2007). However, Argyri and Sorace (2007) has shown that at the age of 8 years bilingual English-Greek children have acquired the correct production of null and overt subjects in their null-subject language. On the other hand,

as far as the acceptance of redundant overt subjects is concerned, the English-dominant bilinguals were found to differ significantly from the control group of monolingual adults. As this study considers experimental data from children which are even older than the subjects studied by Argyri and Sorace, it is probable that the bilingual children at this age will not differ significantly from their monolingual peers concerning the use of overt subjects in both the elicited production and the acceptability judgement task.

As far as the choice of an antecedent for a pronoun is concerned, this structure is expected to cause bigger problems to bilingual children, as it is more complex compared to the use of null and overt subjects and involves the coordination of many different factors. Based on the results of previous studies (Sorace and Filiaci, 2006; Serratrice, 2007), the bilingual children are expected to have bigger problems with overt compared to null pronouns and the difficulties are expected to be bigger in backward rather than forward anaphora.

I will first describe the two languages of the bilingual children, Greek and German, and the reasons these languages are appropriate for an investigation of possible crosslinguistic influence. In the following chapter, I will move on to the methodology which will be used and to the description of the different groups of participants, their language dominance, the materials used and the testing procedure.

### **3.2. Morphosyntactic contrasts between Greek and German**

The two languages of the bilinguals which were included in this study are Greek and German. These languages differ in a number of respects concerning several syntactic features and the consequent setting of various parameters. A general comparison of the two languages is beyond the scope of this dissertation, although a relatively brief contrastive analysis with respect to the structures under examination will be undertaken in order to clarify the reasons these languages and these specific structures are appropriate to test the effects of bilingualism on constructions belonging to the syntax-pragmatics interface.

### 3.2.1. The distribution of subjects

Several studies have found evidence to support that all children, despite whether they acquire a null-subject language or not, drop subjects in the early stages of language acquisition (i.e. Rizzi, 1994: 249). However, monolingual children seem to learn quite early whether their language allows subject drop or not. Two different views have been proposed concerning the setting of the so-called ‘null-subject parameter’ in child language. According to Rizzi, this parameter is initially set to the null-subject value (Rizzi, 1982) and in case the child acquires a non null-subject language, it resets the parameter around the age of two; according to the other approach, this parameter is initially unset (Valian, 1994: 273) and Valian argues that there is no default setting and that the child sets the parameter based on evidence from the input he/she receives. These two approaches represent the parameter with a different metaphor, the former describing it as a switch which is set one way or the other, and the latter as a scale, which is initially perfectly balanced (Valian, 1994: 282).

As far as the possibility of dropping subjects is concerned, Greek is a null-subject language and native speakers drop subjects in the majority of contexts. According to Joseph and Philippaki (1987: 36), the omission of a subject pronoun is obligatory whenever it is used in a noncontrastive or unemphatic context. As a result, overt subject pronouns are used only in specific contexts in order to express certain discourse functions. Moreover, there are some constructions in which the use of an overt subject is impossible, as for example with the existential verb *echi* (there is), with expressions of state of nature or with certain impersonal predicates. On the contrary, in all these cases an overt dummy subject must be used in German.

The fact that subject drop is permitted by the Greek language has been associated with its rich morphology, as verbs are marked for agreement and the endings are different for each person and number (Tsiplakou, 1998). As a result, a native speaker can easily recover the content of a null subject and according to Dimitriadis (1996), overt subjects are a marked choice which is used by native speakers due to discourse-pragmatic factors, such as expression of topic shift. Consequently, topic shift is impossible in cases in which a null subject is used, when it is interpreted as coreferential with an already mentioned topic or a topic which is easily recoverable

from the context. Finally, the fact that Greek licenses null subjects is acquired early on by monolingual children (Tsimpli et al., 2003).

German, on the contrary, is not a null-subject language, although omission of subjects is sometimes possible, especially in colloquial expressions. In these cases, the main clause subject, which occupies the specifier of C in a verb-second construction, is dropped (Rizzi, 1994: 255). This option is, however, not available if the subject appears in a clause internal position, if the specifier of C is occupied by another preposed element and if an embedded clause is used; furthermore, subjects are not overtly expressed in the case of coordinate clauses and when the imperative is used, with the exception of the polite form. Although the use of null subjects is usually associated with rich morphology, as in the case of Italian or Greek, German does not permit subject drop in spite of its relatively rich morphology (Rizzi, 1986). This characteristic has been attributed to the fact that the endings of the verb in German are not different for each person and some endings are empty.

According to some estimations, null subjects in adult German are used in 5% of the utterances (Weissenborn, 1990) and according to others, this percentage is estimated around 0.6% (Rasetti, 1995). As a result, sentences with null subjects constitute a small minority. According to Cardinaletti (1990: 75), null subjects in German are possible only with contextually salient elements, while White has argued that although German has relatively rich verbal agreement, null subjects are not possible because they cannot be identified due to the fact that agreement (Agr) lacks the feature [+pronominal]. This latter feature is, however, necessary for the identification of a null subject (White, 2003: 103). In Greek, on the other hand, agreement has the feature [+pronominal] and null subjects are therefore licensed.

Based on this description of the two languages, one can predict that the ambiguous input the bilingual Greek-German children are confronted with due to the surface overlap between the two languages could result in the overproduction and overacceptance of overt subject pronouns in their null-subject language in contexts which would require a pragmatically appropriate null subject. This influence is expected to be found especially in the early stages of language acquisition. However, it is not clear whether these structures are prone to crosslinguistic influence even in

the children examined in this study, who are at a quite late stage of language acquisition.

### **3.2.2. Anaphora resolution in Greek and German**

The second structure which will be studied is anaphora resolution in Greek using a main and an embedded clause which contains either a null or an overt pronoun. The choice of pronoun antecedents will be examined in two different constructions, forward and backward anaphora. The interpretation of anaphora also belongs to the syntax-pragmatics interface, as the speaker has to coordinate the syntactic knowledge of his/her language and the discourse-pragmatic context of the sentence in order to choose the correct referent of a pronoun.

This construction has been examined using different populations and language combinations. Sorace & Filiaci (2006) studied near-native speakers of Italian, whose native language was English and compared them to monolingual speakers of Italian. In this study, the near-native speakers did not encounter any problems when a null pronoun was used, although their interpretation of overt pronouns differed from that of native speakers of Italian, especially in backward anaphora. Similar results were obtained in other studies (i.e. Belletti, Bennati and Sorace, 2007). Serratrice (2007) tested anaphora resolution by bilingual Italian/English children at approximately 8 years of age using a picture verification task and reached a similar conclusion, as bilinguals accepted an overt pronominal subject as coreferential with the subject of the main clause significantly more often than their age-matched monolingual controls.

As far as pronoun antecedents are concerned, the Greek language is similar to Italian and when a null pronoun is used, it is normally interpreted as coreferential with the subject of the main clause. The use of an overt pronoun signals topic shift and is interpreted as coreferential either with the complement of the main clause or with another extralinguistic entity which has not been introduced to the discourse. The emphatic third person pronoun, which is used to indicate topic shift, is marked for number, gender and case and it appears in emphatic or contrastive contexts (Stephany, 1997).



As far as German is concerned, there are two classes of pronouns, the personal pronouns *ich*, *du*, *er...* and the demonstrative pronouns *der/die/das* and *dieser/diese/dieses*. According to Ehlich, these two types of pronouns have different discourse functions and native speakers of German use personal pronouns to indicate that the same referent is maintained while demonstrative pronouns reveal topic shift (Ehlich, 1982). Moreover, DeLisle (1994) argues that demonstrative pronouns are used in German if the topic the speaker refers to has already been introduced in the sentence in a non-subject position and the sentence contains more than one candidate as a possible antecedent. As a result, demonstrative pronouns are used to signal topic switch or contrast, while personal pronouns indicate topic continuity. In any case, an overt pronoun, whether personal or demonstrative, has to be used in German in order to refer either to the subject or to the complement of the matrix clause. Consequently, the obligatory use of a pronoun in German could influence the use of pronouns by bilingual children in Greek as well as the interpretation of anaphora. As the two languages differ concerning the use of pronouns in order to refer to an antecedent, possible confusion is likely to be found in the group of bilinguals. Moreover, based on the results of the above-mentioned studies, the differences between bilinguals and monolinguals are expected to be more obvious in constructions which involve backward anaphora.

## **CHAPTER 4**

### **Methodology**

This chapter contains a description of the methodology which was used as well as an analysis of the characteristics of the different groups of participants and of the criteria which were used in order to evaluate language dominance in the bilingual children. It also includes a description of the materials which were used in order to test each construction and of the procedure which was followed. Finally, it will set out how the data were coded in order for the statistical analysis of the next chapter to be carried out.

#### **4.1. Participants**

This study included 30 bilingual Greek-German children with a mean age of approximately 13 years who live in Athens, have one German- and one Greek-speaking parent and attend the German School of Athens. The special status of this school, which consists of two separate departments, a Greek and a German one, is expected to play a decisive role in determining their linguistic dominance. According to the hypothesis made before the collection of the data, the children which were attending the Greek department were expected to be dominant in Greek while those which were attending the German department would have a greater probability of being dominant in German, in spite of the fact that they were growing up in a Greek-speaking community. This hypothesis was supported by the data which will be analyzed in the following sections as well as in the discussion of the results.

##### **4.1.1. Greek-dominant bilinguals**

The Greek department of the German school of Athens includes both children from bilingual families as well as monolingual ones, whose parents' native language is Greek. As a result, they have acquired only Greek as a first language and were

exposed to German only later on through formal instruction at school. The children in this department are taught in both languages, as half of the subjects are taught in Greek and half in German. As the majority of the children who attend these classes are only native speakers of Greek, the language they speak to each other outside the classroom is almost exclusively Greek. As a result, the bilingual Greek/German children in these classes are expected to be dominant in Greek, since they live in a Greek-speaking community and have everyday contact with their Greek-speaking peers. In addition to this, in the last year of school the students of the Greek department have the opportunity to obtain both the Greek and the German high school diploma. As a result, the two languages are treated in a similar way: they are both languages of instruction and have a similar status as far as the possibility of obtaining a high school degree is concerned. In other words, although the children in these classes are expected to be dominant in Greek, German is not an inferior subject that is taught as a second language, but a medium of instruction for several important subjects, such as biology, physics, chemistry and mathematics. The group of children which attend these classes and were included in this study consists of 15 bilinguals (7 boys and 8 girls) with a mean age of 13 years and 8 months (range: 12;6 – 14;6).

#### **4.1.2. German-dominant bilinguals**

The German department, on the other hand, has exactly the opposite profile. Apart from the bilingual children, whose parents have Greek and German as native languages and who grow up in a bilingual environment, these classes also have many monolingual German-speaking pupils, who have had little contact with Greek, as many of them have been living in Greece only for a short period of time. The language of instruction is German, and Greek is taught as a second language only for four hours a week. As a result, due to the fact that many of their classmates speak only German, the main language which is used when the bilinguals in this department interact with their classmates is German. Consequently, although these bilinguals grow up in a Greek-speaking community, many of them are expected to be dominant in German due to their everyday interaction with their German-speaking peers and their education in an almost exclusively German-speaking environment. Twenty children from this department were examined and, based on the questionnaire which

was completed by the parents and on a short interview with the children, five of them were excluded, as they were found not to have enough contact with Greek in order to be described as bilinguals and participate in this study. As a result, 15 children were tested in the end (5 boys and 10 girls), with a mean age of 13 years and 6 months (range: 12;5 – 14;8).

Finally, it must be noted that although the children of these two departments attend the same school, they do not have much contact with each other, as they attend separate classes and have different timetables. Moreover, the difference between the two departments is also reflected, up to a certain extent, in their mentality, with the children which attend the German department having more German characteristics with respect to their identity and everyday life. These differences enforce the lack of contact between the children of the two departments.

#### **4.1.3. The Greek monolingual children and adults**

Two control groups were also included in this study, one of 11 age-matched monolingual Greek-speaking children (5 boys and 6 girls, mean age: 13 years and 9 months, range: 13;0 – 14;5) and one of 13 monolingual adults (2 male and 9 female, mean age: 24 years and 10 months, range: 23;3 - 26;11). As far as these two groups are concerned, it was important that they had no contact with German in order to participate in the study. However, both groups have had some contact with other foreign languages, especially with English. As English is taught in Greek schools, it is impossible to find children at the age of 13 years who have had contact only with their native language. However, the children which were included in the study have been exposed only to English at school and their proficiency in this language is relatively low. As far as the adult controls are concerned, it is also almost impossible to find participants at a young age who did not have any contact at all with English. As a result, the criterion in order to include a native speaker of Greek in the adult control group is a relatively low exposure to English with a concomitantly low proficiency. Moreover, none of the participants has spent extensive periods of time in an English-speaking environment. However, almost all speakers of Greek have some

contact with English due to the fact that English-speaking culture is relatively popular in Greece.

## **4.2. Materials and procedure**

The methodology which was used has been adapted from other studies which examined similar subjects with different language combinations. Two structures were tested: the use of null and overt subject in [-topic shift] conditions and the choice of an antecedent for null and overt pronouns. The former was studied using both elicited production data and acceptability judgements; the latter using a picture verification task, in which the participants were asked to choose the picture which they thought depicted the content of the sentence in the most accurate way.

The elicited production was carried out first in order to avoid any possible influence from the acceptability judgements and the order of the test items was randomized. Apart from the test items, fillers were also included in the procedure. As the bilingual children were studied in their school premises, the time available with them was limited (approximately 45 minutes) and it was therefore impossible to examine more structures or to elicit larger speech samples. The control groups of monolingual children and adults were tested in their homes and care was taken to allow for a testing time similar to that of the bilingual children. With respect to the child participants, the parents signed a form of consent in order for them to participate in the study and also completed a questionnaire which provided information on the linguistic profile of their family. These data, in addition to a short interview with each child, were used in order to determine language dominance in the bilingual children and decide whether they meet the necessary criteria in order to be included in the study. As far as the monolingual controls are concerned, the questionnaires and the interviews were used in order to ensure that the participants did not have any contact with German and that they have had limited exposure to other foreign languages.

#### **4.2.1. Null and overt subjects**

The materials used to test the use of subjects in contexts which do not involve topic shift were adapted from a study by Argyri and Sorace (2007).

Elicited production task: The participants were shown a picture of a cartoon or a person performing an action. They were then asked why they think this person is performing this action. They were encouraged to start their sentence with *jati* (*because*). As previously mentioned, Greek is a null-subject language and thus the appropriate structure in these cases is the use of a null subject because there is no topic shift and the referent is highly prominent, the topic having been mentioned in the preceding sentence. This part included 8 items, with 5 test items which were designed to elicit the structure under examination and 3 fillers, which had a similar format but were designed to elicit irrelevant responses in order to distract the participants.

Acceptability judgement task: The participants were again presented with a picture showing a character performing an action. They were then again asked why they think this character is performing the action shown in the picture. In this task the participants were asked to choose between two possible answers, both starting with *jati* (*because*). These answers were identical in their structure and the only difference between them was that one of them contained a null and the other an overt pronoun, which referred to the subject of the preceding sentence. The participants were then asked to choose the answer they preferred. As all sentences described [–topic shift] conditions, the appropriate choice in Greek would be the sentence with the null subject. This part also consisted of 5 experimental items and 3 fillers.

#### **4.2.2. Anaphora resolution**

The materials used were adapted from the studies by Tsimpli et al. (2004) and by Sorace and Filiaci (2006).

In this study, the participants were also administered a picture verification task (PVT). In other words, they were first presented with a sentence describing an action and then

shown three pictures. In the first, the action was performed by the subject of the main clause, in the second by the object and in the third by another person who wasn't mentioned in the sentence. They were then asked to point to the picture that best matched the sentence. The sentences used contained either a null or an overt pronoun and both forward and backward anaphora were tested. This part consisted of 12 test items and 6 fillers. Half of the test items were designed to test the choice of a referent when a null pronoun was used and the other half contained an overt pronoun. In addition to this, half of the sentences tested forward anaphora and the other half tested backward anaphora. As a result, the experimental items can be divided into 4 groups, each of which tests a different combination (null pronouns in forward and backward anaphora, overt pronouns in forward and backward anaphora). The fillers had a similar structure but tested irrelevant constructions and they were included in order to distract the participants.

All pictures were presented on a MacBook and the sentences the participants listened to were recorded and played to them. The answers the participants gave were also recorded.

### **4.3. Transcription and coding**

After the collection of the data, the relevant parts of the responses of all groups were transcribed and coded in order to be analyzed statistically. As far as the coding of the responses is concerned, in the first part, which examined the use of null and overt subjects, the participants were assigned a point each time they produced a structure with a null subject and each time they chose the answer with the null subject in the acceptability judgement task, since in both tasks the correct answer involved the production or the choice of the null subject. As a result, the maximum score a participant could achieve was 5 in each task, as there were 5 test items. For each choice of the sentence with the overt subject and for each production of a redundant overt subject the participants were not assigned any points.

As far as the choice of pronoun antecedents is concerned, the participants were presented with three different options and the total times they chose each referent (the

subject of the main clause, the complement or the third extralinguistic entity) as an antecedent were calculated. As a result, the highest score a participant could achieve was 3, since 3 test items were used in each combination tested.



## CHAPTER 5

### Results

#### 5.1. Null and overt subjects

The use of null and overt subjects in Greek was tested with two different tasks, an elicited production and an acceptability judgement task. I will first state the results from the elicited production task and then move on to the analysis of the data from the acceptability judgement task.

##### 5.1.1. Elicited production task

Figure 1 shows the results of the elicited production task. The bars represent the mean scores of the four groups concerning the production of null subjects in [–topic shift] conditions. In all sentences tested, the correct choice was the production of a null subject. As there were 5 test items in this section, the highest score a participant could achieve was 5.

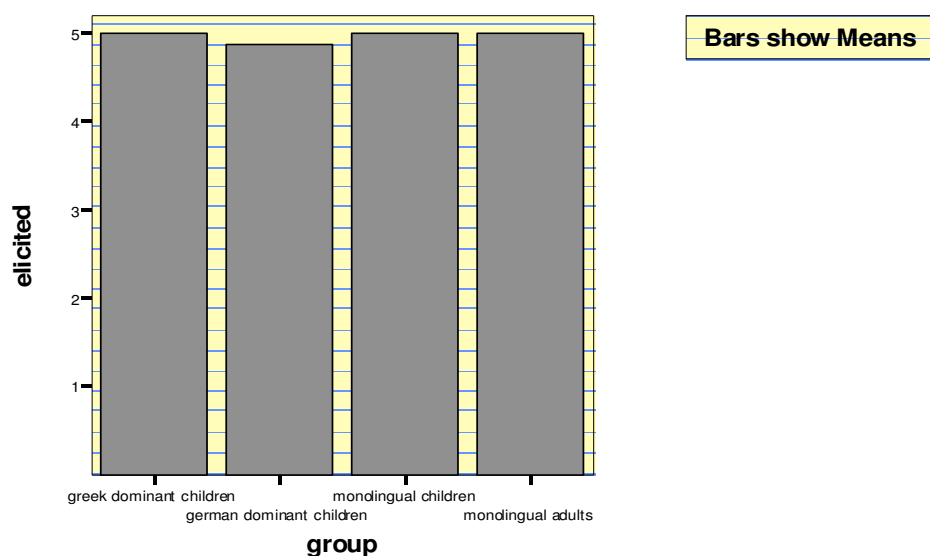


Figure 1. Mean scores for the production of null subjects in [–topic shift] conditions.

As shown in this chart, the performances of the four groups do not seem to differ in this task: only the German-dominant children fail to perform at ceiling and the difference compared to the other groups seems to be relatively small. Apart from the German-dominant bilinguals, all other three groups performed 100% correct, meaning that they did not produce any overt subject.

The following table summarizes the descriptive statistics of the four groups in this task and it reports the group mean scores as well as the standard deviations. Moreover, the percentage of null subjects produced was also calculated.

ELICITED PRODUCTION	Greek-dominant bilinguals	German-dominant bilinguals	Monolingual children	Monolingual adults
Mean	5.00	4.870	5.00	5.00
Percentage	100%	97.4%	100%	100%
SD	0.00	0.352	0.00	0.00

Table 1. Summary of descriptive statistics in the elicited production task.

The data were analyzed using a one-way ANOVA with Group as the independent variable (Greek-dominant children, German-dominant children, monolingual children, monolingual adults) and Score as the dependent variable. According to the results of the ANOVA, there is no significant difference between the four groups ( $F(3,51) = 1.902$ ;  $p > .05$ ). As a result, no further analysis of these data was conducted and both groups of bilinguals can be treated as having acquired the correct production of null subjects in Greek. Consequently, no transfer effects from German are seen as far as the production of subjects in Greek is concerned in any group of bilinguals.

### 5.1.2. Acceptability judgement task

Figure 2 reports the mean scores of the four groups concerning the acceptance of an overt subject in conditions where a null subject would be the appropriate choice. This part also contained 5 test items. As a result, the highest score a participant could achieve was 5.

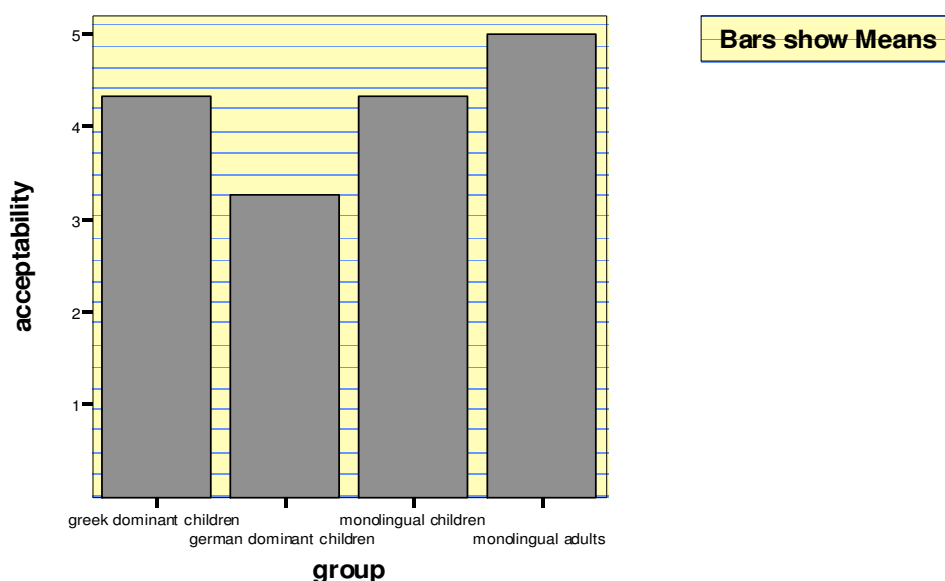


Figure 2. Mean scores for the acceptance of null subjects in [-topic shift] conditions.

As shown in this figure, the four groups of participants exhibit greater differences with respect to the acceptance of overt subjects in the acceptability judgement task compared to the production of overt subjects in the elicited production task. In the acceptability judgement task only the monolingual adult controls performed at ceiling, as they did not accept any sentence with an overt subject, while the other groups show variable performance. Moreover, the bilinguals who are dominant in Greek seem to perform similar to the monolingual Greek children while the German-dominant bilinguals have the lowest mean, as they accept more overt subjects compared to all other three groups.

The following table summarizes the descriptive statistics for the acceptability judgement task.

ACCEPTABILITY JUDGEMENT	Greek-dominant bilinguals	German-dominant bilinguals	Monolingual children	Monolingual adults
Mean	4.33	3.27	4.33	5.00
Percentage	86.6%	65.4%	86.6%	100%
SD	0.816	0.961	1.073	0.00

Table 2. Summary of descriptive statistics in the acceptability judgement task.

As this table shows, the pattern of results is more varied in the acceptability judgement task and the performance of the four groups of speakers differs compared to the elicited production task in which only the German-dominant bilinguals failed to produce the right form in 100% of the cases.

The data obtained in this task were again analyzed using a one-way ANOVA with Group as the independent variable and Score as the dependent variable. According to the results of the ANOVA, there is a highly significant difference in the performance of the four groups in this task ( $F(3,51) = 10.641$ ;  $p < .001$ ). These results, however, do not specify the source of the difference. In order to identify the exact source of the difference between the four groups, a Tukey post hoc test was conducted on the data, which revealed a significant difference between the mean score of the German-dominant children and all other groups. Specifically, the German-dominant bilinguals were found to differ significantly from the Greek-dominant bilinguals ( $p = 0.005$ ), from the monolingual children ( $p = 0.009$ ) and from the monolingual adult controls ( $p = 0.000$ ). The Greek-dominant bilinguals, on the other hand, do not differ significantly neither from their monolingual Greek peers nor from the monolingual adult controls.

As a result, it can be argued that transfer effects concerning the acceptance of overt subjects in [-topic shift] conditions are evident only in the bilinguals who are dominant in German and who differ significantly from both their monolingual peers and the Greek-dominant bilinguals.

Thus, bilinguals who are dominant in Greek have reached the monolingual norm in both tasks, while those who are dominant in German don't differ from monolinguals only concerning the production of null subjects. However, their performance is different with respect to the acceptance of overt subjects in [-topic shift] conditions.

## 5.2. Anaphora resolution

### 5.2.1. Forward anaphora

The following tables and figures summarize the choices of antecedents made by the four groups of participants in forward anaphora in two different conditions. Table 3 and figure 3 report the data when a null pronoun was used in the subject position of the subordinate clause while table 4 and figure 4 report the respective data when an overt pronoun was used. The tables contain the mean scores, standard deviations and percentages for all four groups. As there were 3 experimental items tested in each structure, the highest score a participant could achieve was 3. The figures report the choices of antecedents in percentages. I will first analyze the data of the participants in the structures with null pronouns and then move on to the sentences where an overt pronoun was used.

#### 5.2.1.1. Forward anaphora with null pronouns<sup>1</sup>

ANTECEDENT OF NULL PRONOUNS	Greek- dominant children	German- dominant children	Monolingual children	Monolingual adults
<u>Subject</u>				
Mean	2.80	2.33	2.92	2.92
Percentage	93.3%	77.7%	97.3%	97.3%
SD	0.561	0.900	0.289	0.277
<u>Complement</u>				
Mean	0.20	0.67	0.08	0.08
Percentage	6.7%	22.3%	2.7%	2.7%
SD	0.561	0.900	0.289	0.277

Table 3. Choice of antecedents in forward anaphora with null pronouns.

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<sup>1</sup> The third option *other* is not included in tables 3 and 4, as no participant chose an extralinguistic antecedent not mentioned in the matrix clause when a null pronoun was used in the subordinate clause in forward anaphora.

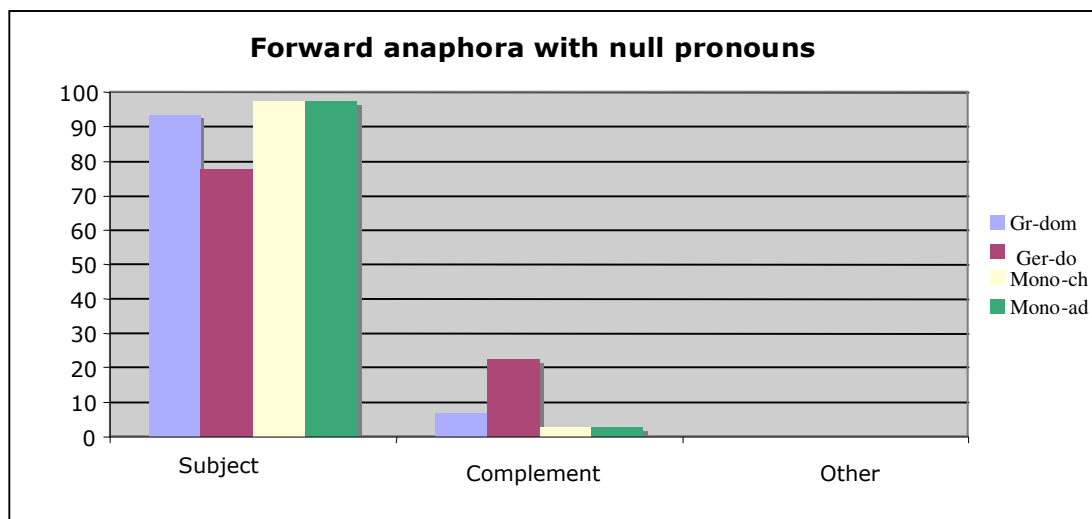


Figure 3. Choice of antecedents in forward anaphora with null pronouns.

As seen in the above table and figure, although all four groups chose the subject of the main clause as an antecedent for a null pronoun in forward anaphora in the majority of the cases, the percentage of the German-dominant bilinguals is lower compared to that of the other three groups (German-dominant children = 77.7%, Greek-dominant children = 93.3%, monolingual children = 97.3%, monolingual adults = 97.3%). These numbers indicate that the monolingual control groups of children and adults as well as the bilinguals who are dominant in Greek have clear intuitions about the choice of an antecedent in forward anaphora with null pronouns, since all of them prefer the subject of the main clause in over 90% of the cases.

The data were analyzed using a mixed Group x Referent ANOVA, with Group (Greek-dominant children, German-dominant children, monolingual children, monolingual adults) as the between-subjects factor and Referent (Subject, Complement, Other) as the within-subjects factor. According to the results, the effect of Referent was found to be highly significant ( $F(2, 102) = 363.095, p < .001$ ). The interaction between Referent and Group was also found to be significant ( $F(6,102) = 3.227, p < .05$ ).

In order to identify precisely where the differences of the mixed ANOVA are to be found, a series of one-way ANOVAs were conducted on the data. According to the results, the four groups differed significantly concerning the choice of the subject of the main clause as an antecedent for a null pronoun ( $F(3,51) = 3.227, p < .05$ ).

The Tukey post hoc test, which was conducted after the ANOVA, revealed that the only significant difference lies between the German-dominant bilinguals and the control groups of monolingual children and adults ( $p < .05$ ). These results indicate that the German-dominant bilinguals have not reached the monolingual norm while the Greek-dominant ones are indistinguishable from both their monolingual peers and the adult participants.

The same seems to hold for the choice of the complement as an antecedent of a null pronoun in forward anaphora.

#### 5.2.1.2. Forward anaphora with overt pronouns

ANTECEDENT OF OVERT PRONOUNS	Greek- dominant children	German- dominant children	Monolingual children	Monolingual adults
<u>Subject</u>				
Mean	0.13	0.47	0.17	0.08
Percentage	4.3%	15.7%	5.7%	2.7%
SD	0.561	0.900	0.289	0.277
<u>Complement</u>				
Mean	2.87	2.53	2.83	2.92
Percentage	95.7%	84.3%	94.3%	97.3%
SD	0.561	0.900	0.289	0.277

Table 4. Choice of antecedents in forward anaphora with overt pronouns.

As can be seen from the data in the above table, in the majority of the cases all groups of speakers chose the complement of the main clause as an antecedent for the overt pronoun in the subordinate clause. With respect to the choice of the subject as an antecedent, only the German-dominant bilinguals favored this choice in 15.7% of the sentences, while the percentages of the three other groups are similar and relatively low (Greek-dominant bilinguals = 4.3%, monolingual children = 5.7%, monolingual adults = 2.7%). Moreover, no participant chose the extralinguistic antecedent which was not mentioned in the main clause.

The following figure presents the percentages of the above-mentioned data graphically.

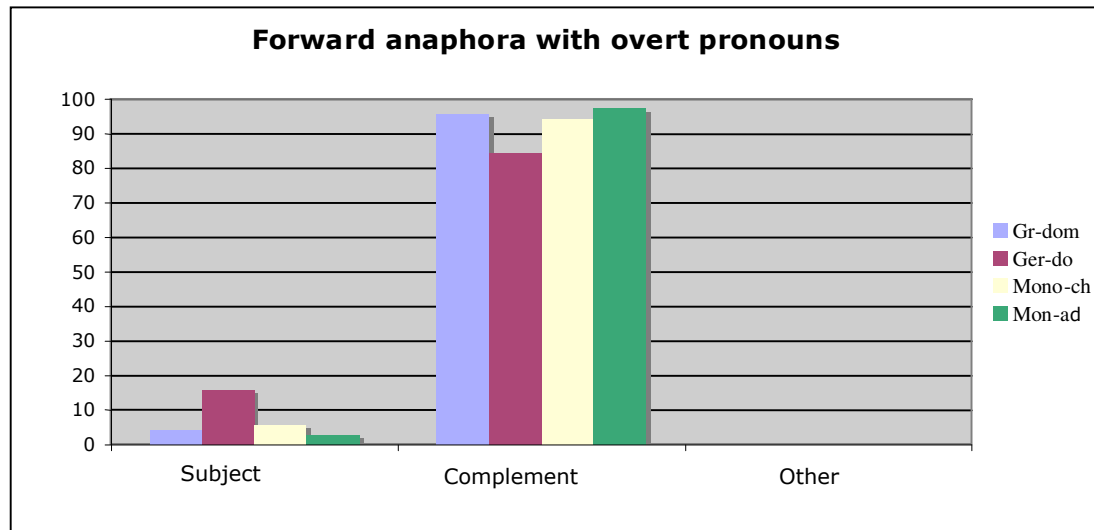


Figure 4. Choice of antecedents in forward anaphora with overt pronouns.

According to the results of the mixed ANOVA which was conducted on the data of the four groups in forward anaphora with overt pronouns, with Group as between-subjects factor and Referent as within-subjects factor, there is a highly significant effect of Referent ( $F(2,102) = 555.994, p < .001$ ). Yet, there is no significant interaction between Referent type and Group ( $F(6,102) = 1.869, p > .05$ ). As a result, contrary to what seems to hold for forward anaphora with null pronouns, the four groups do not differ significantly from each other with respect to the choice of an antecedent in forward anaphora with overt pronouns. Consequently, no further statistical analysis of these data was carried out.

### 5.2.2. Backward anaphora

The following section presents the results of the statistical analysis when backward anaphora was tested. This section again consists of two parts. In the first part, the data for the use of a null pronoun in the subordinate clause are presented, while the second part reports the respective data when an overt pronoun was used in the subject position of the subordinate clause.



The following table and figure report the means, the standard deviations and the percentages for the choice of each referent as an antecedent by all four groups of speakers. As there were 3 experimental items in each section, the highest score a participant could achieve was again 3.

### 5.2.2.1. Backward anaphora with null pronouns

The picture presented in the above section, where forward anaphora was analyzed, changes when backward anaphora is taken into consideration. The following table and figure summarize the data of the participants for backward anaphora when a null pronoun was used in the subordinate clause.

ANTECEDENT OF NULL PRONOUNS	Greek- dominant children	German- dominant children	Monolingual children	Monolingual adults
<u>Subject</u>				
Mean	2.40	1.80	2.25	3.00
Percentage	80%	60%	75%	100%
SD	0.910	0.862	1.138	0.00
<u>Complement</u>				
Mean	0.20	0.93	0.00	0.00
Percentage	6.7%	31%	0%	0%
SD	0.775	0.704	0.000	0.000
<u>Other</u>				
Mean	0.40	0.27	0.75	0.00
Percentage	13.3%	9%	25%	0%
SD	0.632	0.594	1.138	0.000

Table 5. Choice of antecedents in backward anaphora with null pronouns.

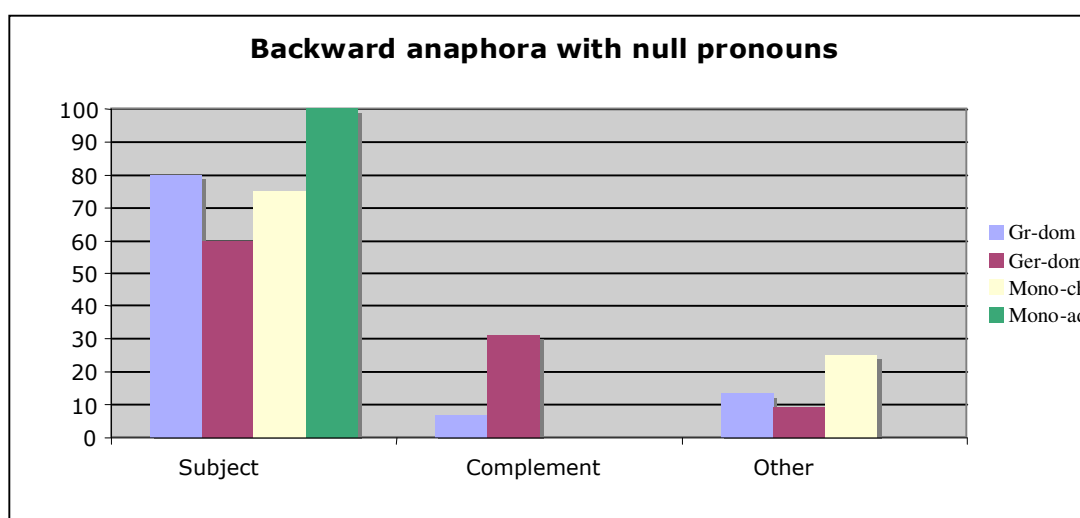


Figure 5. Choice of antecedents in backward anaphora with null pronouns.

If one compares the data from forward and backward anaphora, one of the most striking differences is that in backward anaphora with null pronouns some speakers of all groups, with the exception of the monolingual adult controls, chose the extralinguistic antecedent, which was never favoured by any speaker in forward anaphora. When a null pronoun was used in the subordinate clause in backward anaphora, the group of monolingual adults performed at ceiling, as they chose the subject of the main clause as an antecedent in 100% of the cases. The groups of monolingual children and Greek-dominant bilinguals also chose the subject as an antecedent in the majority of the cases and their percentages are similar (80% vs. 75%). However, the German-dominant bilinguals preferred the subject of the main clause as an antecedent for the null pronoun in the subordinate clause in only 60% of the cases.

The data were analyzed using a mixed ANOVA, with Group as between-subjects factor and Referent as within-subjects factor. According to the results, there is a highly significant effect of Referent ( $F(2,102) = 101.438, p < .001$ ) and there is also a highly significant interaction between Referent and Group ( $F(6,102) = 4.953, p < .001$ ).

A series of one-way ANOVAs were performed in order to identify the source of the difference between the four groups. According to the results, there is a significant

difference concerning the choice of the subject as an antecedent ( $F(3,51) = 4.777, p < .05$ ). However, according to the post hoc tests, only the difference between the German-dominant children and the monolingual adults turned out to be statistically significant ( $p < .05$ ).

The difference between the four groups is more striking with respect to the choice of the complement of the main clause as an antecedent for the null pronoun in the subordinate clause. While both monolingual children and adults did not favor this choice in any case and the Greek-dominant bilinguals chose the complement only in 6.7% of the cases, the percentage of the German-dominant children is much higher, as it reaches 31%.

The results of the one-way ANOVA revealed that the four groups differ significantly from each other ( $F(3,51) = 9.326, p < .001$ ). The Tukey post hoc test showed that this difference can be attributed to the significant difference between the German-dominant children and all other groups ( $p < .05$  in all comparisons).

Finally, in this condition all groups of children seem to differ from the adult controls concerning the choice of a third extralinguistic entity as an antecedent of a null pronoun. While the adults did not choose this option in any case, the monolingual children favored it in 25% of the cases, the Greek-dominant bilinguals in 13.3% and the German-dominant children in 9% of the sentences. However, according to the results of the statistical analysis of these data, the difference between the four groups did not turn out to be significant.

Moreover, as can be seen in figure 5, the choices of the German-dominant bilinguals follow a different pattern compared to the other groups and a quick comparison based on the figure reveals that the difference between the choice of each referent is smaller in the German-dominant children compared to the other groups. In other words, the difference between the choice of the subject and the complement as an antecedent by the German-dominant bilinguals is smaller compared to the difference between these two choices by the rest of the groups. As a result, it is not clear whether the German-dominant bilinguals have clear intuitions concerning the choice of an antecedent in backward anaphora with null pronouns or if the distribution of their answers can be attributed to chance. According to the descriptive statistics, the means for the choice

of each referent by the German-dominant bilinguals differ (Subject: 1.80, Complement: 0.93, Extralinguistic antecedent: 0.27). To test whether this difference is significant, a repeated measures ANOVA was conducted on the data. According to the results, the difference between the choice of the three referents turned out to be highly significant ( $F(2,28) = 11.150, p < .001$ ). Consequently, it can be argued that the German-dominant bilinguals do have intuitions concerning the choice of a referent, but these intuitions are not as clear as those of the other three groups of speakers.

#### 5.2.2.2. Backward anaphora with overt pronouns

The following table and figure summarize the data from backward anaphora when an overt pronoun is used in the subordinate clause.

ANTECEDENT OF OVERT PRONOUNS	Greek- dominant children	German- dominant children	Monolingual children	Monolingual adults
<u>Subject</u>				
Mean	0.27	0.87	0.42	0.46
Percentage	9%	29%	14%	15.3%
SD	0.910	0.862	1.138	0.00
<u>Complement</u>				
Mean	0.67	1.60	0.75	0.85
Percentage	22%	53.3%	25%	28.3%
SD	0.976	0.828	0.965	0.987
<u>Other</u>				
Mean	2.07	0.53	1.83	1.69
Percentage	69%	17.7%	61%	56.4%
SD	1.223	0.743	1.267	1.182

Table 6. Choice of antecedents in backward anaphora with overt pronouns.

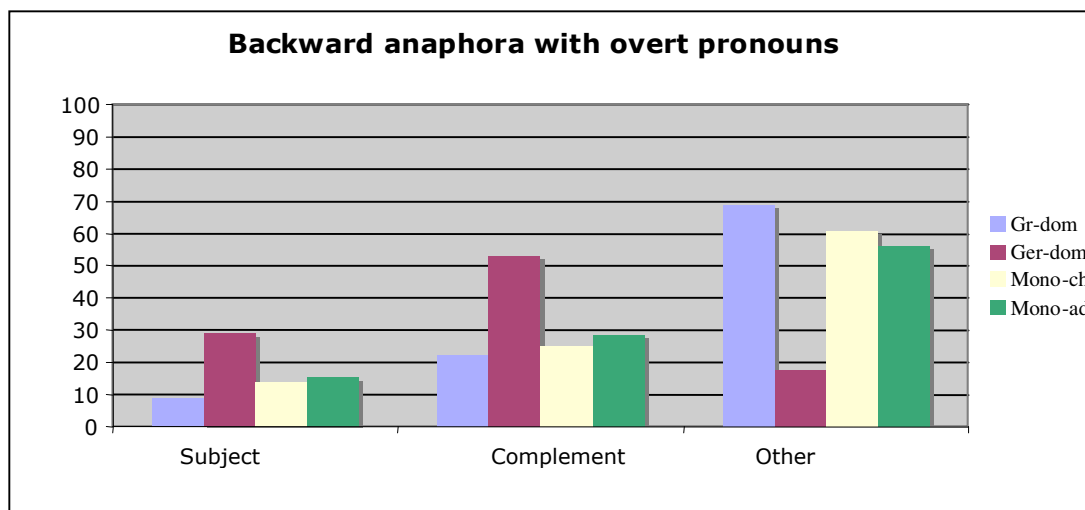


Figure 6. Choice of antecedents in backward anaphora with overt pronouns

These data were also analyzed using a mixed ANOVA, with Group as between-subjects factor and Referent as within-subjects factor. According to the results, there is a highly significant effect of Referent ( $F(2,102) = 11.453, p < .001$ ). There is also a significant interaction between Referent and Group ( $F(6,102) = 4.182, p < .05$ ).

As far as the choice of the subject as an antecedent is concerned, the four groups differed from each other, with German-dominant bilinguals choosing this option in 29% of the cases, followed by the monolingual adults, the monolingual children and the Greek-dominant bilinguals (15.3%, 14% and 9% respectively).

A one-way ANOVA was conducted in order to identify whether this difference is significant and whether it contributes to the significant interaction found in the mixed ANOVA. According to the results, however, the data of the four groups concerning the choice of the subject as an antecedent did not turn out to differ significantly ( $F(3,51) = 2.394, p > .05$ ).

As far as the choice of the complement as an antecedent is concerned, only the group of German-dominant bilinguals favored this choice in the majority of the cases (53.3%), while the percentages of the remaining three groups are similar and are all around 25% (Greek-dominant bilinguals = 22%, monolingual children = 25%, monolingual adults = 28.3%).

According to the one-way ANOVA which was conducted on these data, this difference turned out to be statistically significant ( $F(3,51) = 3.071, p < .05$ ) and according to the Tukey post hoc test, the two groups of bilinguals differ significantly from each other ( $p < .05$ ), while all the other comparisons failed to reach the level of being statistically significant.

All groups, with the exception of the German-dominant bilinguals chose the extralinguistic third entity as an antecedent for an overt pronoun in backward anaphora in the majority of the cases, with the Greek-dominant bilinguals choosing it in 69% of the cases, the monolingual children in 61% and the monolingual adults in 56.3% of the cases.

According to the results of the one-way ANOVA which was conducted, this difference turned out to be significant ( $F(3,51) = 5.561, p < .05$ ). According to the multiple comparisons of the post hoc test, the group of German-dominant bilinguals differs significantly from all the other groups of participants ( $p < .05$  in all three comparisons). The remaining three groups did not turn out to differ significantly from each other.

Finally, as it is not clear from figure 6 whether the means for the choice of each referent differ significantly from each other in the group of German-dominant bilinguals (Subject: 0.87, Complement: 1.60, Extralinguistic antecedent: 0.53), the within-group differences were analyzed with the use of a repeated measures ANOVA. According to the result, the difference turned out to be significant ( $F(2,28) = 4.621, p < .05$ ). Consequently, the German-dominant bilinguals do have clear intuitions concerning the choice of an antecedent in backward anaphora with overt pronouns, but these intuitions are different compared to those of the other three groups, as the German-dominant bilinguals are the only ones who chose the complement of the main clause as an antecedent in the majority of the cases, while the rest of the groups clearly favored the extralinguistic antecedent.

## **CHAPTER 6**

### **Discussion**

This chapter provides a discussion of the results presented in the previous section. The first part presents an analysis of the conclusions which can be drawn from the results of each structure when examined separately while the remaining parts contain a more general discussion of the possible explanations for these results and the factors which contribute to the occurrence of the trend found in this study.

#### **6.1. Null and overt subjects**

As one can see from the results concerning the production of subjects in the elicited production task, the four groups do not differ from each other and even the German-dominant bilinguals have reached the monolingual norm performing almost at ceiling. However, this picture changes if the data from the acceptability judgement task are taken into consideration, since in this case the bilinguals exhibit significant differences with respect to the acceptance of redundant overt subjects. Although the two tasks were designed to test the acquisition of the same structure, the results seem at first contradictory, since it is only in the acceptability judgement task that the group of German-dominant bilinguals differs significantly from all other groups. As a result, the German-dominant bilinguals perform in a different way in the two tasks, although the structure under examination remains the same.

These findings could, however, be attributed to the different nature of the two tasks. In the first one, the participants were asked to produce a subject which would refer to a highly prominent topic, since they were able to see the picture while they were producing the sentence. Moreover, the experimenter could also see the picture. The fact that the referent was highly prominent and that it was also shared knowledge between the participant and the experimenter might have influenced the results, according to which even the German-dominant bilinguals do not exhibit transfer effects from German onto Greek. However, the nature of the acceptability judgement

task is different as the participants were presented with two options and they were asked to choose the one they preferred. In practice only the adult controls performed exactly the same way in the two tasks as they did not accept any redundant overt subject in any case. Even the monolingual children and the Greek-dominant bilinguals, on the other hand, performed less accurately in the acceptability judgement compared to the elicited production task. This difference is more obvious in the group of German-dominant bilinguals, who might be more affected by the special nature of the task for various reasons which will be analyzed in the general discussion of the study. However, there does seem to be a clear task effect.

Moreover, it must be noted that the sample was relatively small and it might be the case that the differences would be more obvious if a larger sample had participated in this study. Furthermore, it could be argued that it is more difficult to make bilingual children produce redundant overt subjects in experimental conditions than to make them accept overt subjects in the place of pragmatically appropriate null subjects. One possible solution in order to minimize the task effect would be to make the referent less prominent and to try to make the children produce sentences with null or overt pronouns in the subject position in a task which would be more complicated. The children would, therefore, be caught off guard to a greater extent and thus might produce a higher number of pragmatically inappropriate overt subjects in [-topic shift] conditions.

## **6.2. Anaphora resolution**

As far as the choice of an antecedent of a pronoun in Greek is concerned, the results of the four different constructions which were tested (forward anaphora with null and overt pronouns, backward anaphora with null and overt pronouns) were presented in the previous chapter. As one can see from these results, the German-dominant children differ from the Greek-dominant ones, the first making choices which are not identical or even similar to those made by monolingual speakers and the latter seeming to have acquired the monolingual norm, at least when compared to their monolingual Greek-speaking peers.



The choice of an antecedent for a pronoun can be divided into two constructions, which require different processing strategies. While in forward anaphora the speaker encounters the main clause first, which is then followed by the subordinate clause containing either an overt or a null pronoun, the picture is different in backward anaphora. In these structures the pronoun (either overt or null) is encountered first and the participant must return to the subordinate clause after he/she encounters the main clause in order to look for the correct antecedent. As a result, different processing strategies are used in the two cases, each requiring a different processing load, with backward anaphora being more complicated and more difficult to analyze. Moreover, it must be noted that backward anaphora is less frequent in Greek, as it is a marked choice which is used in special discourse conditions. As a result, it is less natural and even monolingual Greek speakers face bigger problems with this construction compared to forward anaphora.

As far as forward anaphora is concerned, the German-dominant children differed in their intuitions from the control groups only when a null pronoun was used. In the case of forward anaphora with overt pronouns, the difference between German-dominant children and the other groups failed to reach the necessary level in order to be considered statistically significant ( $p = .093$ ). However, one must bear in mind that this difference might turn out to be significant if a bigger sample was used. Moreover, the fact that the difference is not statistically significant does not imply that it is non-existent, as one can see from the picture presented in figure 4 in the previous chapter. In this figure it is clear that the German-dominant children do differ from the Greek-dominant ones, especially when compared to the monolingual norm.

However, the picture changes if one takes into consideration the results from backward anaphora. When a null pronoun was used in these constructions, the German-dominant children turned out to differ significantly from all other groups. The picture is similar in backward anaphora with overt pronouns, as the German-dominant bilinguals again exhibit striking differences from the monolingual norm. These results indicate that the German-dominant children have different intuitions concerning the choice of antecedents, especially in the case of backward anaphora. In German both types of pronouns (personal and demonstrative) refer to entities which have already been introduced to the discourse and thus the German-dominant

bilinguals have not developed intuitions similar to these of monolingual Greek speakers, who chose an extralinguistic antecedent in the vast majority of the sentences tested with overt pronouns in backward anaphora.

In the case of forward anaphora, on the contrary, the differences found between German- and Greek-dominant bilinguals are smaller and the choices of the German-dominant bilinguals follow the same trend as those made by the other three groups. This difference becomes obvious if the graphs of forward and backward anaphora are compared with each other. In backward anaphora with overt pronouns, while the other three groups chose the extralinguistic antecedent in the majority of the cases, followed by the complement and then the subject, the German-dominant bilinguals chose the complement in the majority of the cases, followed by the subject and the extralinguistic antecedent. As a result, the group of German-dominant children does not follow the same trend as the other three groups, and they have different intuitions concerning certain structures due to various reasons, which will be analyzed in the following part of this discussion.

### **6.3. General discussion**

The children which participated in this study are older than those examined by other researchers, such as the subjects in Argyris's and Sorace's study (2007), who had a mean age of approximately 8 years and the subjects in the study by Sorace et al. (2009), which included a group of children aged from 8 to 10 years. The mean age of the children in this study, on the contrary, is approximately 13 years. While based on the length of exposure to Greek one would expect that these children would have reached the monolingual norm, the study showed that only the Greek-dominant ones perform like monolingual Greek children, while those who are dominant in German differ in a number of respects from the monolingual controls of their age.

The above-mentioned results can be explained by a number of related factors, whose interaction forms a picture of considerable complexity. Some of the explanatory factors considered in this discussion are the special status of interfaces, the transfer effects from German and the differences concerning the linguistic dominance of the

two groups of bilinguals. Moreover, the different input the two groups of bilinguals are exposed to and the different processing abilities between bilinguals and monolinguals in general, and in particular between bilingual children which differ concerning the language in which they are dominant will also be taken into consideration.

### **6.3.1. The special status of interfaces**

Both structures examined in this study belong to the interface between syntax and pragmatics, since the production of an inappropriate form does not result in an ungrammatical sentence but rather in a pragmatically inappropriate utterance. In order for a speaker of Greek to choose between an overt and a null subject and to opt for the correct antecedent of a null or an overt pronoun, he/she must coordinate his/her syntactic knowledge of the language with the discourse features of the special circumstances, such as topic shift and focus.

The structures which belong to interfaces have been found to be problematic not only for simultaneous bilinguals but also for other groups of speakers who differ from monolinguals, such as near-natives. Although these speakers started learning a language after the so-called critical period, they seem to have acquired it at a native-like level and their performance seems indistinguishable from that of native speakers in a number of aspects. However, several studies have found that they differ from the native norm concerning constructions which belong to interfaces (Hopp, 2004; Belletti, Bennati and Sorace, 2007). Moreover, the interface between syntax and pragmatics has also been found to be vulnerable in speakers who are under the process of attrition (i.e. Montrul, 2004). According to the results of a study by Tsimpli et al. (2004) which included Italian and Greek near-native speakers of English and tested constructions at the syntax-pragmatics interface, such as the interpretation of pronoun antecedents, distinct differences were found between the control and the experimental groups. The authors attribute these differences to the fact that the process of attrition affects interpretable features of the syntax, which belong to interfaces. Finally, the syntax-pragmatics interface has also been found to be an area of difficulty for second language learners (Sorace, 2003).

These differences have been attributed to the special characteristics of these structures, since a speaker must have knowledge not only of the core properties of the syntax but also of the discourse conditions which license certain features. As such fine-grained properties are more difficult to acquire, it is more demanding to produce them in an appropriate way. This explanation seems to hold especially for the German-dominant bilinguals who were included in this study.

Although no structures belonging to the domain of narrow syntax were examined due to practical difficulties and especially due to the lack of the time which is necessary in order to test more constructions, the short interview with the bilingual children did not reveal any striking difficulties in core syntax, such as word order mistakes. However, it is necessary to test these constructions in an experimental setting in order to draw conclusions concerning the vulnerability only of structures which belong to the syntax-discourse interface.

### **6.3.2. Transfer effects and linguistic dominance**

According to the results of this study there seem to be transfer effects from German onto Greek in the structures under examination. However, the existence of these transfer effects is strongly related to the pattern of linguistic dominance, as influence from German was found only in the group of bilingual children dominant in this language while the children dominant in Greek did not face any difficulties and did not differ from their monolingual peers. As a result, it can be argued that bilingualism *per se* does not explain the differences found between bilinguals and monolinguals.

Moreover, the results of this study do not stand in line with the predictions of Müller and Hulk, according to which crosslinguistic influence depends only on language internal factors (Müller and Hulk, 2001). The pattern found in this study points to the fact that dominance plays a decisive role in determining the possible existence of crosslinguistic influence and it interacts with language internal, structural factors. While the Greek-dominant children do not transfer the constructions of German, despite having contact with that language on a daily basis, the German-dominant ones are more influenced by the German language and this influence is reflected in their linguistic abilities in Greek.

As dominance is a relatively complicated concept, which requires many different factors to be taken into consideration, the following section contains a description of the linguistic profiles of the two groups of bilinguals based on the data from the questionnaire completed by the parents. This analysis is necessary, as the linguistic profiles of the families and the children explain not only the pattern of dominance but also the manifestation or absence of influence from German onto Greek.

### 6.3.3. Linguistic profile and input

	German-dominant children	Greek-dominant children
<u>Length of exposure</u>		
Mean	10;2	12;8,
Range	3;5 – since birth	8;0 – since birth
Born in Greece	9/15 (60%)	12/15 (80%)
<u>Language spoken at home</u>		
Greek	6.7% (1/15)	6.7% (1/15)
German	33.3% (5/15)	0% (0/15)
Both	60% (9/15)	93.3% (14/15)
<u>Language spoken with siblings</u>		
Greek	9.1% (1/11)	58.3% (7/12)
German	63.6% (7/11)	0% (0/12)
Both	27.3% (3/11)	41.7% (5/12)
<u>Language spoken with friends</u>		
Greek	13.3% (2/15)	93.3% (14/15)
German	60% (9/15)	0% (0/15)
Both	26.7% (4/15)	6.7% (1/15)
<u>Movies, TV, music, websites etc.</u>		
Greek	0% (0/15)	53.3% (8/15)
German	66.7% (10/15)	26.7% (4/15)
English	33.3% (5/15)	20% (3/15)
<u>Parents' estimate of use and dominance</u>		
Greek	20% (3/15)	93.3% (14/15)
German	60% (9/15)	0% (0/15)
Both	20% (3/15)	6.7% (1/15)

Table 7. Summary of the data provided by parents concerning the input the bilingual children are exposed to.

As far as the input and the resulting linguistic profile of the family and consequently of the bilingual children are concerned, table 7 summarizes the data from the questionnaire completed by the parents. As one can see from the table, the two groups of bilinguals differ in a number of respects concerning the input to which they are exposed. First, there is a difference concerning the length of exposure to the Greek language, as the German-dominant children have been exposed to Greek for a mean time of 10 years and 2 months, while the Greek-dominant bilinguals have had contact with Greek for a mean time of 12 years and 8 months. This difference can mainly be attributed to the fact that 60% of the German-dominant bilinguals were born in Greece, while the same holds for 80% of the Greek-dominant children.

As far as the language of the parents is concerned, there are no differences at all, as all children which participated in this study grow up in families in which the native language of the one parent is Greek and of the other German. As a result, it is expected that the most common pattern in these families will be the *one parent-one language* strategy.

However, although there are no differences concerning the native languages of the parents, the linguistic profiles of the families of the two groups of bilinguals differ substantially, as in 33.3% of the families with German-dominant children the main language spoken at home is German, while no parent of a Greek-dominant child reported that they mainly use German at home. As a result, the children are exposed to different input, with a higher percentage of German-dominant children being exposed not only to the German input they get in the environment of their school but also to mainly German input at home. Moreover, while only 60% of the German-dominant children grow up in families where both languages are used at home systematically, this percentage is much higher in the families with Greek-dominant children (93.3%).

This difference is reflected in the language used when the children interact with their siblings, since the majority of German-dominant children use German (63.6%), while in the case of Greek-dominant bilinguals, the language which is used to speak with siblings in the majority of the cases is either mainly Greek (58.3%) or both Greek and German (41.7%).

Moreover, there is also a difference concerning the language the children speak with their friends, as the majority of Greek-dominant bilinguals use mostly Greek (93.3%) while the German-dominant ones interact with their friends mostly in German (60%). Moreover, only 26.7% of the German-dominant children seem to speak both languages with their friends, meaning that most of them grow up in an environment where they use German not only at school and with their family but also with children their age.

The fact that most German-dominant children only have limited contact with Greek is also reflected in the parents' report that none of them prefers Greek music, films, websites etc. or watches Greek television systematically, while 53.3% of the Greek-dominant bilinguals do so. In contrast, the majority of the German-dominant children prefer the German language for all these activities (66.7%).

All the above-mentioned data provide evidence to support the assertion that although the two groups of children grow up in a Greek-speaking country, their linguistic profiles differ, as they are exposed to substantially differentiated input, with a large percentage of the German-dominant children being 'isolated' in a German-speaking environment. This difference is reflected in the answer given by the parents when asked whether they think that their child grows up in a mainly German- or Greek-speaking environment: only 20% of the parents of German-dominant children reported that their child grows up in a mainly Greek-speaking community, while 93.3% of the parents of Greek-dominant children stated that their children have contact mostly to Greek. The majority of the parents of the German-dominant group, however, reported that their children are mostly in a German-speaking environment (60%), while no parent of the other group did so.

The aforementioned observations suggest that the differences found in the intuitions of the two groups of children concerning the structures examined in this study might be a result of the input they are exposed to. It might be the case that although the German-dominant children grow up in a Greek-speaking country, they do not have enough contact with the Greek language in order to be able to perform similarly to monolinguals. However, the exposure to sufficient input is necessary to develop the abilities required in order to have clear intuitions, especially concerning structures which belong to interfaces. As we have already observed, the special status of

interfaces requires the coordination of different types of information, and knowledge of the core syntax of the language is not sufficient. As a result, the lack of input might result in the inability to coordinate all the necessary information and in the production and acceptance of pragmatically inappropriate constructions.

#### **6.3.4. Developmental trends**

Another factor which must be taken into consideration are the differences found between the groups of monolingual children and adults; it must be examined whether these differences are similar to those found between adults and bilingual children. If it is the case that the differences between the two groups of speakers (bilingual and monolingual children) and the adult controls are similar, certain significant differences found in the results of this study can be attributed to the developmental trends which characterize the group of children as a whole and not to the effects of bilingualism.

As one can see from the figures presented in the previous chapter, there are clear differences when one compares monolingual children and adults in most of the structures tested. Specifically there is a clear difference between the choice of null and overt subjects in the acceptability judgement task between the two groups. Moreover, the performance of Greek-dominant bilinguals and monolingual children is almost identical. However, both groups differ from the adult range, as even monolingual children accept more redundant overt subjects than monolingual adults. It is also worth noting that this tendency is bigger in the group of German-dominant bilinguals.

The same seems to hold for most structures examined in anaphora resolution. Although the differences found did not turn out to be statistically significant, the figures indicate that the performance of the two groups of monolingual speakers is not identical. This difference is found especially in backward anaphora. In these structures there are clear developmental differences, especially when a null pronoun is used in the subordinate clause. Although the only statistically significant difference was found between the German-dominant children and the monolingual adults, figure 5 indicates that the remaining two groups of children (the Greek-dominant bilinguals



and the monolinguals) perform in a similar way, which differs clearly from the intuitions of adults. This difference, although smaller, is also found if one looks at figure 6, which presents the choices of the participants in backward anaphora with overt pronouns. As a result, it can be argued that the German-dominant bilinguals differ from the monolingual adults in the same direction as the other two groups of children do, only to a bigger extent.

Consequently, one can reach the conclusion that all groups of children use the same mechanisms when asked to perform the tasks in this study. However, due to the bigger processing load or due to the existence of inhibitory mechanisms which must be stronger in the group of German-dominant children in order to inhibit the German language, the tendency found in the groups of monolingual and Greek-dominant children is stronger in the German-dominant bilinguals. However, on the whole, it is found in the same direction as in the other groups of children.

The fact that the differences are found mostly in backward anaphora strengthens the processing explanation which will be analyzed in the following section, according to which bilingual children differ in their processing abilities, being unable to coordinate in an effective way all the information required in order to analyze backward anaphora in particular and structures at the syntax-pragmatics interface in general.

### **6.3.5. Processing account**

The developmental perspective, which was outlined in the previous section, stands in line with an explanation of the differences found between monolingual and bilingual speakers based on the processing abilities of the two groups and the fact that they allocate their processing resources in a different way. As far as the acceptance of redundant overt subjects is concerned, all groups of children differ with respect to the adult controls. This difference indicates that children and adults in general process language in a different way, and that this difference is more obvious in the German-dominant children, as they have bigger problems in processing their weaker language.

These results could be explained based on the different amount of inhibition required in order to use a language depending on whether the language which has to be

inhibited is the stronger or the weaker one. According to this reasoning, bilinguals would be required to inhibit one language in order to use the other. It might be the case that the amount of inhibition required depends on the status of the language which must be inhibited (whether it is the weaker or the stronger language of the bilingual speaker). In the group of German-dominant children the inhibition of the German language is stronger compared to the Greek-dominant bilinguals, since this language is weaker in this group compared to Greek and therefore does not have to be inhibited as strongly as in the group of German-dominant children. This explanation is reinforced by several experiments which have been conducted using primes and have reached the conclusion that both languages of bilinguals are active during language processing and the one which is not used must be suppressed. Moreover, the fact that asymmetrical switching costs have been found strengthens the argument that different levels of inhibition are required depending on the status of the language as the stronger or the weaker one (i.e. Meuter and Allport, 1999).

This explanation based on the different computational load the two groups of speakers are confronted with is reinforced by the results found in a study by Sorace et al. (2009). According to this study, certain structures, as for example overt subject pronouns, are a default, as even Italian-Spanish bilinguals who acquire two null-subject languages were found to produce more redundant overt subjects compared to their monolingual peers. This default construction might be enforced if a child is confronted with ambiguous input when he/she acquires two languages, only one of which is a null-subject language. Moreover, this tendency might be even stronger if the bilingual children are tested in their weaker language. As a result, the German-dominant children in this study might accept more overt subjects than the children belonging to the other groups, since being dominant in German, which is not a null-subject language, accords with a tendency found in bilingual children in general to choose the default form, namely the overt subject. The argument about the existence of a default form is enforced by the findings of a study by Bini (1993), according to which speakers of Spanish who learn Italian as a second language produce more overt subjects when they are at an intermediate level of proficiency compared to monolingual Spanish and Italian speakers (in Sorace, 2004).

Consequently, the results of this study stand in line with an explanation based on the different processing abilities of bilingual and monolingual children in general and they provide evidence supporting that the way a bilingual child is able to process one of his/her languages is largely dependent on whether this language has the status of the stronger or the weaker one.

## CHAPTER 7

### Conclusions

The findings of this study and their discussion of the previous chapter suggest that crosslinguistic influence is the outcome of the interaction of a number of different factors. The results found are in line with previous studies on younger bilinguals with different language combinations and show that crosslinguistic influence is present in bilingual acquisition when the children are exposed to ambiguous input and the structures under examination belong to the interface between syntax and pragmatics. However, contrary to the hypothesis of Müller and Hulk (2001), language internal factors alone cannot explain the pattern found, since in several cases the two groups of bilinguals showed significant differences with respect to their linguistic intuitions in Greek, suggesting that more factors must be taken into consideration, such as linguistic dominance and the input the two groups of bilinguals are exposed to.

Moreover, the linguistic profile of the two groups of bilinguals in this study, which was also analyzed in the discussion of the results, shows that dominance is a complicated concept. Although all bilinguals are growing up in a Greek-speaking community, the input to which they are exposed differs significantly, with a large number of the German-dominant children being ‘isolated’ in a German-speaking environment. The fact that the German-dominant bilinguals were found to differ from the Greek-dominant ones in several aspects suggests that the isolation in an environment where a different language than that of the community is spoken, can result in differentiated linguistic intuitions even at later stages of language acquisition. As a result, it turns out that it is necessary to enforce both languages of bilingual children on an everyday basis in order to achieve native-like performance in both languages.

Future research on bilingual language acquisition with different language combinations and bigger groups of participants remains to be done in order to reach final conclusions concerning the differences found in this study. Moreover, structures which do not belong to interfaces need to be tested in similar groups of speakers in

order to establish whether the above-mentioned 'isolation' in a German-speaking environment results not only in differences in the syntax-pragmatics interface but also in the domain of core syntax. This finding would separate representational differences from the difficulty of coordinating different types of information when structures at interfaces are examined. Finally, it would be interesting to test these groups of bilinguals not only in Greek but also in German, in order to establish whether the differences found in the linguistic intuitions of the German-dominant children in Greek are similar to those found in the group of Greek-dominant bilinguals if the German language was tested.

## References:

1. Argyri, E. and Sorace, A. (2007). Crosslinguistic influence and language dominance in older bilingual children. *Bilingualism: Language and Cognition* 10: 79-99.
2. Belletti, A., Bennati, E. and Sorace, A. (2007). Theoretical and developmental issues in the syntax of subjects: evidence from near-native Italian. *Natural Language and Linguistic Theory* 25 (4): 657-689.
3. Bini, M. (1993). La adquisición del italiano: más allá de las propiedades sintácticas del parámetro pro-drop. In: Licerias, J. M. (Ed.), *La lingüística y el análisis de los sistemas no nativos*: 126-139. Dovehouse: Ottawa.
4. Cardinaletti, A. (1990). Subject/object asymmetries in German null-topic constructions and the status of specCP. In J. Mascaró and M. Nespó (Eds). *Grammar in Progress: Glow essays for Henk van Riemsdijk*: 75-84. Dordrecht: Foris.
5. De Houwer, A. (1995). Bilingual language acquisition. In P. Fletcher and B. MacWhinney (Eds). *The Handbook of Child Language*: 219-250. Oxford: Blackwell.
6. DeLisle, H. (1994). Anaphora, Pragmatics and Style in German. In S. C. Herring and J. C. Paolillo (Eds). *UTA Working Papers in Linguistics 1*: 153-159. Program in Linguistics at the University of Texas at Arlington.
7. Dimitriadis, A. (1996). When pro-drop languages don't: Overt pronominal subjects and pragmatic inference. In L.M. Dobrin, K. Singer and L. McNair (Eds). *Papers from the 32nd Regional Meeting of the Chicago Linguistics Society*: 33-47. Chicago: Chicago Linguistics Society.
8. Döpke, S. (1998). Competing Language Structures: the Acquisition of Verb Placement in Bilingual German-English Children. *Journal of Child Language* 25: 555-584.

9. Ehlich, K. (1982). Anaphora and deixis: same, similar, or different? In R. Jarvella and W. Klein (Eds). *Speech, Place, and Action*: 315-358. New York: Wiley & Sons.
10. Genesee, F. (1989). Early bilingual language development: one language or two? *Journal of Child Language* 16: 161-179.
11. Grosjean, F. (1982). *Life with Two Languages*. Cambridge, MA: Harvard University Press.
12. Grosjean, F. (1994). Individual bilingualism. In R.E. Asher and J.M. Simpson (Eds). *The Encyclopedia of Language and Linguistics*. Vol.3. Oxford: Pergamon Press.
13. Hachohen, A. and Schaeffer, J. (2007). Subject realization in early Hebrew/English bilingual acquisition: The role of crosslinguistic influence. *Bilingualism: Language and Cognition* 10 (3): 333-344.
14. Hopp, H. (2004). Syntactic and interface knowledge in advanced and near-native interlanguage grammars. *EUROSLA Yearbook* 4 (1): 67-94. Amsterdam/Philadelphia: John Benjamins.
15. Joseph, B. and Philippaki-Warbuton, I. (1987). *Modern Greek*. London: Croom Helm.
16. Kupisch, T. (2007). Determiners in bilingual German-Italian children: what they tell us about the relation between language influence and language dominance. *Bilingualism: Language and Cognition* 10: 57-78.
17. Meisel, J. (1989). Early Differentiation of Languages in Bilingual Children. In K. Hyltenstam and L.K. Obler (Eds). *Bilingualism across the Lifespan: Aspects of Acquisition, Maturity and Loss*: 13-40. Cambridge: Cambridge University Press.
18. Meuter, R. and Allport, A. (1999). Bilingual Language Switching in Naming: Asymmetrical Costs of Language Selection. *Journal of Memory and Language* 40 (1): 25-40.

19. Montrul, S. (2004). Subject and object expression in Spanish heritage speakers: A case of morphosyntactic convergence. *Bilingualism: Language and Cognition* 7: 125-142.
20. Müller, N. and Hulk, A. (2001). Crosslinguistic influence in bilingual language acquisition: Italian and French as recipient languages. *Bilingualism: Language and Cognition* 4 (1): 1-21.
21. Nicoladis, E. (1998). First clues to the existence of two input languages: pragmatic and lexical differentiation in a bilingual child. *Bilingualism: Language and Cognition* 1: 105-116.
22. Paradis, J. and Navarro, S. (2003). Subject realization and crosslinguistic interference in the bilingual acquisition of Spanish and English: what is the role of the input? *Journal of Child Language* 30: 371-193.
23. Paradis, J., Nicoladis, E. and Crago, M. (2007). French-English bilingual children's acquisition of the past tense. In H. Caunt-Nulton, S. Kulatilake and I.-H. Woo (Eds.) *Proceedings of the 31st Annual Boston University Conference on Language Development*: 497-507. Somerville, MA: Cascadilla Press.
24. Pinto, M. (2006). Subject pronouns in bilinguals: Interference or maturation? In V. Torrens and L. Escobar (Eds). *The acquisition of syntax in romance languages*: 331–350. Amsterdam/Philadelphia: John Benjamins.
25. Rasetti, L. (1995). *La distribution du sujet nul dans la grammaire enfantine du français*. Memoire de licence: University of Geneva.
26. Rizzi, L. (1982). *Issues in Italian Syntax*. Dordrecht: Foris.
27. Rizzi, L. (1986). Null Objects in Italian and the Theory of pro. *Linguistic Inquiry* 17: 501-557.
28. Rizzi, L. (1994). Early Null Subjects and Root Null Subjects. In B. Lust, G. Hermon and J. Kornfilt (Eds). *Syntactic Theory and First Language*



*Acquisition: Cross-linguistic Perspectives: Binding, Dependencies and Learnability* (2): 249-272. Hillsdale, New Jersey: L. Erlbaum Associates.

29. Serratrice, L. (2007). Cross-linguistic influence in the interpretation of anaphoric and cataphoric pronouns in English-Italian bilingual children. *Bilingualism: Language and Cognition* 10 (3): 225-238.
30. Serratrice, L., Sorace, A. and Paoli, S. (2004). Crosslinguistic influence at the syntax–pragmatics interface: Subjects and objects in English–Italian bilingual and monolingual acquisition. *Bilingualism: Language and Cognition* 7 (3): 183-205.
31. Sorace, A. (2003). Near-nativeness. In C. Doughty and M. Long (Eds). *Handbook of Second Language Acquisition*: 130-151. Oxford: Blackwell.
32. Sorace, A. (2004). Native language attrition and developmental instability at the syntax-discourse interface: Data, interpretations and methods. *Bilingualism: Language and Cognition* 7 (2): 143-145.
33. Sorace, A. and Filiaci, F. (2006). Anaphora resolution in near-native speakers of Italian. *Second Language Research* 22: 339-368.
34. Sorace, A. et al. (2009). Discourse conditions on subject pronoun realization: Testing the intuitions of older bilingual children. *Lingua* 119: 460-477.
35. Stephany, U. (1997). The Acquisition of Greek. In D.I. Slobin (Ed). *The crosslinguistic study of language acquisition* (4): 183-333. Mahwah, New Jersey, London: Erlbaum.
36. Tsimpli, I. M. et al. (2003). Subjects in L1 attrition: evidence from Greek and Italian near-native speakers of English. In B. Beachley, A. Brown, and F. Colin (Eds). *Proceedings of the 27th Annual Boston University Conference on Language Development*: 787-797. Somerville, MA: Cascadilla Press.
37. Tsimpli, I. M. et al. (2004). First language attrition and syntactic subjects: A study of Greek and Italian near-native speakers of English. *International Journal of Bilingualism* 8 (3): 257-277.

38. Tsipplakou, S. (1998). *Focus in Greek: its structure and interpretation*. University of London: Doctoral dissertation.
39. Valian, V. (1994). Children's Postulation of Null Subjects: Parameter Setting and Language Acquisition. In B. Lust, G. Hermon and J. Kornfilt (Eds). *Syntactic Theory and First Language Acquisition: Cross-linguistic Perspectives: Binding, Dependencies and Learnability* (2): 273-86. Hillsdale, New Jersey: L. Erlbaum Associates.
40. Volterra, V. and Taeschner, T. (1978). The acquisition and Development of Language by Bilingual Children. *Journal of Child Language* 5: 311-326.
41. Wei, L. (2000). *The Bilingualism Reader*. London, New York: Routledge.
42. Weissenborn, J. (1990). Functional categories and verb movement: The acquisition of German syntax reconsidered. *Linguistische Berichte*: 190-224.
43. White, L. (2003). *Second language acquisition and universal grammar*. Cambridge: Cambridge University Press.

# APPENDICES

## Appendix 1

### Null and overt subjects

#### A. Elicited production task

A sample answer is given for each question item. The test items are written in both the Greek and the Latin alphabet.

1. Q: Γιατί κρατάει πολλές ρακέτες το χταπόδι;

Jati kratai poles raketes to xtapodi?

why hold-3SG many rackets-ACC the octopus-NOM?

‘Why is the octopus holding many rackets?’

A. Γιατί έχει πολλά πόδια.

Jati echi pola podia.

because pro has many legs-ACC.

‘Because it has many legs.’

2. Q: Γιατί γελάνε τα κορίτσια;

Jati jelane ta koritsia?

why laughing-3PL the girls-NOM?

‘Why are the girls laughing?’

A: Γιατί είδαν κάτι αστείο.

Jati idan kati astio.

because pro saw-3PL something funny-ACC

‘Because they saw something funny.’

3. Q: Γιατί απορεί η γάτα με αυτό που βλέπει στον καθρέφτη;

Jati apori i gata me afto pu vlepi ston kathrefthi?

why wonder-3SG the cat-NOM with what pro see-3SG in the mirror-ACC  
'Why does the cat wonder with what she sees in the mirror?'

A: Γιατί βλέπει μία τίγρη.

Jati vlepi mia tigrī.

because pro see-3SG a tiger-ACC

'Because she sees a tiger.'

4. Q: Γιατί τρέχει ο σκύλος;

Jati trechi o skilos?

why run-3SG the dog-NOM

'Why is the dog running?'

A: Γιατί φοβάται τις αστραπές.

Jati fovate tis astrapes.

because pro is afraid of the lightnings-ACC.

'Because he is afraid of lightnings.'

5. Q: Γιατί είναι τρομαγμένο το αγόρι;

Jati ine tromagmeno to agori?

why is scared the boy-NOM

'Why is the boy scared?'

A: Γιατί είδε μια κατσαρίδα.

Jati ide mia katsarida.

because pro saw-3SG a cockroach-ACC

'Because he saw a cockroach.'

## **B. Acceptability judgement task**

The questions and the two possible answers the participants had to choose from are presented in this part.

1. Q: Γιατί είναι προβληματισμένο το αγόρι;

Jati ine provlimatismeno to agori?

why is frustrated the boy-NOM

‘Why is the boy frustrated?’

- A: i. Γιατί αυτό δεν ξέρει τι να κάνει.

Jati afto den kseri ti na kani.

because it-NOM not know-3SG what to do-3SG

‘Because it doesn’t know what to do.’

- ii. Γιατί δεν ξέρει τι να κάνει.

Jati den kseri ti na kani.

because pro not know-3SG what to do-3SG

‘Because it doesn’t know what to do.’

2. Q: Γιατί πήγε στο περίπτερο ο παππούς;

Jati pi je sto periptero o papus?

why went-3SG to the kiosk-ACC the grandfather-NOM

‘Why did the grandfather go to the kiosk?’

- A: i. Γιατί ήθελε να αγοράσει εφημερίδα.

Jati ithele na agorasi efimerida.

because pro wanted-3SG to buy-SG newspaper

‘Because he wanted to buy a newspaper.’

- ii. Γιατί αυτός ήθελε να αγοράσει εφημερίδα.

Jati aftos ithele na agorasi efimerida

because he wanted-3SG to buy-SG newspaper

‘Because he wanted to buy a newspaper.’

3. Q: Γιατί η κότα βάζει δυναμίτη δίπλα στο σκύλο;

Jati i kota vazi dinamiti dipla sto skilo?

why the chicken-NOM put-3SG dynamite-ACC next to the dog-ACC

‘Why is the chicken putting dynamite next to the dog?’

A: i. Γιατί αυτή δεν τον συμπαθεί.

Jati afti den ton simbathi.

because she-NOM not him like-3SG.

‘Because she doesn’t like him.’

ii. Γιατί δεν τον συμπαθεί.

Jati den ton simbathi.

because pro not him like-3SG.

‘Because she doesn’t like him’

4. Q: Γιατί η δασκάλα κοιτάει τον μικρό με απορία;

Jati i daskala kitai ton mikro me aporia?

why the teacher-NOM look-3SG at the little boy-ACC with frustration-ACC

‘Why is the teacher looking at the little boy with frustration?’

A. i. Γιατί δεν ξέρει να λύσει μια τόσο εύκολη άσκηση.

Jati den kseri na lisi mia toso efkoli askisi.

because pro not know-3SG to answer-3SG a that easy question-ACC.

‘Because it doesn’t know how to answer such an easy question.’

ii. Γιατί αυτός δεν ξέρει να λύσει μια τόσο εύκολη άσκηση.

Jati aftos den kseri na lisi mia toso efkoli askisi.

because it-NOM not know-3SG to answer-3SG a that easy question-ACC.

‘Because it doesn’t know how to answer such an easy question.’

5. Q: Γιατί τσακώνονται οι οδηγοί;

Jati tsakononte i odiji?

why argue-3PL the drivers-NOM

‘Why are the drivers arguing?’

A. i. Γιατί τράκαραν.

Jati trakaran.

because pro crashed-3PL.

‘Because they crashed.’

ii. Γιατί αυτοί τράκαραν.

Jati afti trakaran.

because they-NOM crashed-3PL.

‘Because they crashed.’

## Appendix 2

### Anaphora resolution

Picture Verification Task: This part contains the sentences the participants were presented with. After the presentation of the sentences, they had to choose the picture which best matched the content.

#### A. Forward anaphora

##### i. Forward anaphora with null pronouns

1. Η μητέρα μιλάει με την κόρη, ενώ είναι ξαπλωμένη στο κρεβάτι.  
I mitera milai me tin kori, eno ine ksaplomeni sto krevati.  
The mother is speaking to the daughter, while (she) is lying on the bed.
2. Ο παππούς μιλούσε με τον πατέρα, ενώ ζέσταινε το φαγητό.  
O papus miluse me ton patera, eno zestene to fajito.  
The grandfather was speaking to the father, while (he) was heating the food.
3. Η γιαγιά κοιτάζει την εγγονή, ενώ κάθεται στο καναπέ.  
I jaja kitazi tin egoni, eno kathete ston kanape.  
The grandmother looks at the granddaughter, while (she) is sitting on the couch.

##### ii. Forward anaphora with overt pronouns

1. Ο πατέρας μιλάει με τον γιο, ενώ αυτός νυστάζει και θέλει να κοιμηθεί.  
O pateras milai me ton jo, eno aftos nistazi ke theli na kimithi.  
The father is speaking to the son, while he is tired and wants to go to sleep.
2. Η θεία έλεγε τις περιπέτειές της στην ανιψιά, ενώ αυτή ξεφύλλιζε ένα βιβλίο.



I thia eleje tis peripeties tis stin anipsia, eno afti ksefilize ena vivlio.

The aunt was telling her adventures to the niece, while she was holding a book.

3. Ο θείος χαιρέτησε τον ανιψιό, ενώ αυτός στεκόταν μπροστά σε μια βιτρίνα.

O thios cheretise ton anipsio, eno aftos stekotan brosta se mia vitrina.

The uncle greeted the nephew, while he was standing in front of a window.

## **B. Backward anaphora**

### **i. Backward anaphora with null pronouns**

1. Ενώ βλέπει τηλεόραση, ο παππούς εξηγεί στον πατέρα πώς θα πάει στο θέατρο.

Eno vlepi tileorasi, o papus eksiji ston patera pos tha pai sto teatro.

While (he) is watching television, the grandfather is explaining to the father how he will go to the theatre.

2. Ενώ καθάριζε το δωμάτιό της, η θεία έλεγε στην ανιψιά πώς θα περάσει στις διακοπές της.

Eno katharize to domatio tis, I thia eleje stin anipsia pos tha perasi stis diakopes tis.

While (she) was cleaning her room, the aunt was telling the niece what she will do during the summer.

3. Ενώ ήταν στο μπαλκόνι, ο Φώτης χαιρέτησε τον παππού.

Eno itan sto balkoni, o Fotis cheretise ton papu.

While (he) was on the balcony, Fotis greeted the grandfather.

### **ii. Backward anaphora with overt pronouns**

1. Ενώ αυτή έβγαινε από το σπίτι, η θεία χαιρέτησε την ανιψιά.

Eno afti evjene apo to spiti, I thia cheretise tin anipsia.

While she was coming out of the house, the aunt greeted the niece.

2. Ενώ αυτός βιαζόταν, ο παππούς συνέχιζε να μιλάει με τον πατέρα.

Eno aftos viazotan, o papus sinechize na milai me ton patera.

While he was in a hurry, the grandfather continued speaking to the father.

3. Ενώ αυτή ήταν κρυωμένη, η μητέρα έβλεπε τηλεόραση με την κόρη.

Eno afti itan kriomeni, I mitera evlepe tileorasi me tin kori.

While she had a cold, the mother was watching television with the daughter.

## Appendix 3

### Questionnaire

The following questionnaire was completed by the parents of the bilingual children together with a consent form allowing their children to participate in the study. The questionnaire was given to the parents in both Greek and German and was completed by either the Greek- or the German-speaking parent in their respective language:

1. What is your child's date of birth?

.....

2. Where was your child born?

.....

3. If your child wasn't born in Greece, how much time have you spent in a non Greek-speaking environment? What was the language spoken in this country?

.....

4. What is the native language of the parents?

.....

5. How proficient is the German-speaking parent in Greek?

.....

6. Was the child exposed to both Greek and German from the time he/she was born?

.....

7. Has the child had regular exposure to both languages until today?

.....

8. What was the language used by the caregivers of the child?

.....

9. What language does each parent use with the child?

.....

10. How many members does your family consist of?

.....

11. In case your child has siblings, what language do they speak when they interact with each other?

.....

12. What is the main language you use at home?

.....

13. If you have visitors at home, what language do you usually speak?

.....

14. Does your child use mainly Greek or German when he/she interacts with his/her friends?

.....

15. Does your child prefer Greek or German music, movies, websites, books etc.?

.....

16. How many trips every year do you take to Germany? How much time does your child spend in a German-speaking country?

.....

17. If you take everything into consideration, according to your estimation would you say your child spends more time in a Greek- or in a German-speaking environment?

.....

.....

## Biographical data of the participants

<b>Greek-dominant bilinguals</b>	<b>Age</b>	<b>German-dominant bilinguals</b>	<b>Age</b>
1	12;6	1	13;6
2	12;6	2	13;4
3	13;0	3	13;7
4	13;10	4	13;3
5	13;6	5	13;2
6	14;0	6	13;5
7	14;1	7	13;6
8	13;11	8	13;2
9	13;8	9	13;2
10	14;5	10	13;6
11	14;0	11	13;1
12	14;0	12	12;5
13	13;8	13	14;8
14	14;6	14	14;0
15	13;8	15	14;6

<b>Monolingual children</b>	<b>Age</b>	<b>Monolingual adults</b>	<b>Age</b>
1	14;3	1	26;10
2	13;0	2	25;3
3	14;5	3	24;6
4	13;10	4	24;8
5	13;9	5	25;1
6	13;11	6	24;10
7	13;7	7	24;10
8	13;6	8	25;3
9	13;8	9	26;11
10	14;1	10	24;8
11	13;2	11	23;6
		12	23;3
		13	24;0

Table 8. Biographical data of the participants